Biological Birth Order vs Psychological Birth Order & Predictability of Personality

Ali Clarke

18721031

Supervisor: Dr. Matthew Hudson

BA (Hons) Psychology

National College of Ireland

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Table of Contents

Abstract

Biological birth order (BBO) has previously been linked to personality; psychological birth order (PBO), a more recent area of study has also recently been linked to personality. There is less research on links between The current study aimed to determine the relative associations of biological birth order and psychological birth order on personality, with a hypothesis that psychological birth order will be associated with personality independently of biological birth order. A questionnaire was administered to participants (N=161) through social media sites using a convenience snowball sampling technique. The questionnaire measured demographics, biological birth order, personality using the International Personality Item Pool of Golberg's Big Five (1992), and psychological birth order using the Psychological Birth Order Inventory (White & Campbel, 1991). Results of hierarchical multiple regressions, controlling for age and gender, found that neither biological birth order nor psychological birth order predicted significant change in personality markers. A notable difference in scores of biological birth order and psychological birth order was found. Findings suggest there may be other areas in which this difference presents itself. Future research and implications are explored.

Introduction

Birth order is defined as the order in which you are born into your family (Sulloway, 1999). As a biological measure, this is easy to determine. Psychologically, however, you may feel like you suit a certain position, regardless of the one you are biologically born into. Biological birth order has been found to impact a variety of areas including behaviour (Sulloway, 2001; Beck, Burnet & Vosper, 2006), happiness (Allred & Poduska, 1988) intelligence (Sulloway, 2007); career choices (Leong, Hartung, Goh & Gaylor, 2001) and personality (Ernst & Angst, 1983; Beck, Burnet & Vosper, 2006); each of which will be outlined below. Psychological birth order, how someone sees themselves and their role in the family (Campbell, White, & Stewart, 1991), is a more recent field of study that has less research on the extent of impacts but has been linked to similar areas such as personality.

Biological Birth Order (BBO)

First looked at by Alfred Adler in individual psychology (as cited in Ansbacher & Ansbacher, 1956), birth order positions were found to carry different traits concerning their respective role in the family. Adler (as cited in Ansbacher & Ansbacher, 1956) defines each position, firstborn, middleborn, youngest, only children, and bases the reasoning for these differences on the individual experiences of each position. Adler explains the firstborn as getting the full attention of an only child until another child comes along and with that shift in attention comes the need for approval, a sense of responsibility and a level of perfectionism. Middleborns, whether second, third or fourth born, are grouped by Adler (1928) once they are not first or youngest. These middle born children differ from firstborns in several ways including less sense of belongingness, likability when judged by others (Gfroerer, Gfroerer, Curlette, White & Kern, 2003), more sociability and less familial sentiment (Salmon, 2003). The youngest siblings are said to be agreeable, rebellious and often considered to be less intelligent than their older siblings (Herrera, Zajonc, Wieczorkowska & Cichomski, 2003). Only children are often seen as selfish, lonely, maladjusted, and overindulged by their parents. This has led to the opinion of only-child families being far from ideal, however, these negatives stereotypes do not translate through to measured characteristics (Mancillas, 2006; Saad, 2004; Veenhoven & Verkuyten, 1989). While still found to be more autonomous, only children have been distinguished as having more trustworthiness than non-only children (Falbo, 1976).

A recent review of over 200 birth order studies confirms and groups the most commonly found characteristics among each birth order position (Eckstein et al., 2010). The highest statistically significant of these characteristics include the following: firstborns, show the highest academic success, high achievers, and are found to be highly motivated; middleborns, tend to have feelings of not belonging, are sociable, and have the fewest "acting out" problems; youngest born, show the highest social interest, are the most rebellious and the most empathetic; only born, show the most need for achievement, are most likely to go to college and have the most behaviour problems. These differences in characteristics are found to influence a variety of areas including behaviour, influencing radical political and social views, for example, middle children are more likely to engage in diplomacy (Sulloway, 2001; Beck, Burnet, & Vosper, 2006; Feiring, & Lewis, 1980). Other areas include happiness (Allred & Poduska, 1988), career choices (Leong, Hartung, Goh & Gaylor, 2001); with different birth orders presenting different vocational interests and views, and intelligence; many studies have consistently found a decline in intelligence with each additional birth order (Belmont, & Marolla, 1973; Sulloway, 2007; Rohrer, Egloff, & Schmukle, 2015).

Research in the area of birth order may help when it comes to parenting techniques such as "reducing differential parenting" (Varner, & Mandara, 2014); some studies suggest that parental differences between later siblings could be a factor in birth order differences. These differences were reported concerning intelligence, it is possible that awareness and education surrounding these differences, could minimize these differences (Hotz, & Pantano, 2015). Health may be an area that benefits if birth order differences are confirmed. Birth order was previously linked to depression and anxiety (Gates, Lineberger, Crockett, & Hubbard, 1988). (Bijur, Golding, & Kurzon, 1988) found that larger family size meant increased accidents.

These differences between siblings have been found to impact many areas in both animals and humans from a very young age. Competitiveness between siblings is well documented and has also been found in animals such as birds, fish and mammals including Guinea pigs and pigs (Andersen, Nævdal & Bøe, 2011) to an extreme extent, going as far as death, known as siblicide (Mock, & Parker, 1998; Sulloway, 2001). This is often brought on by a lack of sufficient resources as family size increases. While humans do not often have this issue, sibling competition is still known to be a strong factor in the development of personality

(Paulhus, Trapnell, & Chen, 1999; Ernst & Angst, 1983; Beck, Burnet & Vosper, 2006; Eckstein, & Kaufman, 2012).

Personality

Personality is a long-studied topic dating back to the 1920s, with psychologists such as Freud and Allport defining theories of psychoanalysis and introducing the term personality (Freud 1923, as cited by Westen, Gabbard & Ortigo, 2008; Allport (1937) as cited by Nicholson,1998). There is still no universally accepted definition of personality, however, many definitions address it as studying the whole person (McAdams, 2008). Bergner (2020), looks at the issues of this approach, by taking into account other aspects that are important to get a full view of someone. Some of these aspects include statuses, core relationships, occupation and religious identity. This highlights a need for more factors to be taken into account when studying personality types. Another widely reported definition for personality surrounds the idea of psychophysical or psychological subsystems and traits (Allport, 1961; Mayer, 2007; Funder, 2016). It may be beneficial to look at how psychological viewpoints impact these psychological subsystems.

Allport and Odbert set out to determine a lexical description of personality in 1936. They listed 4,504 trait names derived from Webster's New International Dictionary 1925, which comprised almost 400,000 words at the time. Their parameters for selecting words were those that distinguished behaviour between people. Several years later, Cattell (1943; 1945) worked on further decreasing this list to a more compact 16 using factor analysis, grouping common behaviours. This reduced list is what Cattell used to create the 16 Personality Factor Questionnaire (1956; Cattell, Eber, & Tatsuoka, 1970). Out of these factors, five were identified as recurrent and statistically independent of each other while simultaneously being easily understood (Tupes, & Christal, 1992; Norman, 1963). These factors were openness, conscientiousness, extraversion, agreeableness and neuroticism. Goldberg (1990), confirmed these factors and formed the Five Factor Model, also known as the Big Five. This intense lexical condensing over the years allowed for the brief, easily interpretable descriptions while maintaining the broad encompassing of personality.

Goldberg also found that scores on this Big Five tend to stay stable throughout life, with heritability at approximately 50% (1992). Explanations of the traits are as follows: Extraversion,

sometimes named surgency, describes outgoingness and sociability, the alternate end of the spectrum is known as introversion; Conscientiousness, describes responsibleness, dutiful dependability with a tendency to adhere to rules; Agreeableness, comes across as friendliness, and a tendency to get along with others easily; Emotional stability describes an ability to remain calm and experience less stress than those on the lower end of the spectrum, neuroticism, known as a form of emotional chaos; Imagination, or openness, describes an open-mindedness, open to experience.

Looking at some of these traits individually, agreeableness and conscientiousness are found to have the biggest impact on educational attainment and healthy eating habits, indirectly impacting health status (Hampson, Goldberg, Vogt, & Dubanoski, 2007). Conscientiousness has the biggest impact on male earnings while extraversion and emotional stability have the biggest impact on earnings for females (Mueller, & Plug, 2006). Extraversion impacts career promotion to management positions for both male and female employees. (Lee & Ohtake, 2012). When it comes to marital satisfaction, neuroticism has a strong negative correlation, while each other trait, openness, conscientiousness, extraversion and agreeableness, show positive correlations (Donnellan, Conger & Bryant, 2004; Amiri, Farhoodi, Abdolvand, & Bidakhavidi, 2011). These studies show that the areas of lifestyle and career could benefit greatly from awareness of personality traits.

Psychological Birth Order (PBO)

A psychological birth order scale was developed by Campbell, White and Stewart (1991; 2006), aiming to determine whether someone's self-concept and personality reflect those typically associated with their associated biological birth order. It divides people into firstborn, middle born, youngest and only, based on how people feel and see themselves within their own family.

Bowen, in 1966, developed the idea of families being a system, a system that needs to adjust and change upon the birth of subsequent children. One of the main ideals found when implementing Bowen's theories is that the family is the sum of its parts. The idea that each member fits a role in for the family to operate (Bowen 1976; Bowen, 1978; Haefner, 2014). How someone sees themselves and their role in the family has recently been looked at as just as important as biological circumstances.

It has been reported that substantial age gaps between siblings such as five years, can cause a shift in psychological birth order. This is due to the average school-going age causing a decrease in time amongst siblings and therefore the younger sibling feeling a greater sense of independence (Carlson, Watts, & Maniacci, 2006).

There are some contradicting findings on the extent of these birth order effects. Ernst and Angst (1983), and Sulloway (1996), looked at the same data and came to differing conclusions, one that differences have previously been overrated, and another stating dependable patterns can be seen. Others suggest that the effects are seen mainly in within-family designs, that birth order characteristics are observable when looking at the family as a whole, but not displayed as strong between families, or outside of the family dynamic (Rohrer, Egloff & Schmukle, 2015; Bleske-Rechek & Kelley, 2014). If the biological birth order effects are only observed while looking within-family, self-reported views may give different results. The contradicting findings call for confirmation through further investigation.

Some studies also show that different family sizes result in different characteristics within birth order, with firstborns more anxious in smaller families of two or three children compared to the later-born being more anxious in larger families (Bharathi & Venkatramaiah, 1976). It is also important to note the changing size and structure of families in recent years. Many birth order studies were carried out in previous years with mainly large, nuclear family systems. In recent years family sizes in Ireland have been decreasing (CSO, 2016; Coward, 1980), along with other areas of Europe being described as sub-replacement levels; when the average children per family drops below 2.1 which leads to a decrease in population (Goldstein, Lutz, & Testa, 2003). Large households have been associated with fewer mental problems in children (Grinde & Tambs, 2016; CSO, 2020).

Previous psychological birth order studies have shown to help therapists gain a better understanding of clients to help provide the best care approach (Forer, 1977). Therapists aim to understand as much as possible about clients, therefore, interpreting how they see themselves within the family dynamic they were raised in, can give insights into their behaviour and possibly personality.

Current Study

Lohman, Lohman & Christensen (1985) explained that the way one views their ,position is overlooked in the vast previous work on biological birth order effects on personality; psychological birth order aims to fill this void.

Family structures are changing with the appearance of less nuclear families, not only that, but children's views of mixed families; including blended, step, single-parent and extended; have changed to be more accepting of these variations of family dynamics (Nixon, Greene & Hogan, 2006). If family structures are changing and people are seeing themselves in different roles in the family to the biological one they are born into, then more research on the psychological side is required. Similarly, it is important to validate these scales against each other to determine which has a greater predictability power.

Research question: Is psychological birth order a better predictor of personality characteristics than biological birth order?

Aims: To determine the relative associations of biological birth order and psychological birth order on personality.

Hypothesis: Psychological birth order will be associated with personality independently of biological birth order.

Null Hypothesis: Psychological birth order will not be associated with personality independently of biological birth order.

Methods

Participants

Participants were recruited using a convenience snowballing method through various social media platforms including Facebook, Whatsapp, Instagram and Snapchat. Participants were invited to share the link with anyone eligible. The analysis was restricted to those who identified as male or female, therefore one non-binary participant was excluded. The final sample consisted of 161 participants, 116 females and 45 males, with a mean age of 39, a standard deviation of 13.85, ranging from 18 to 72. This sample size fulfilled two equations for minimum requirement calculation. Tabachnick and Fidell's (2013) formula for calculating sample size for multiple regression analysis ($N > 50 + 8m$; where N=number of participants and m=number of predictor variables) for the current study was N=66. Stevens (1996) suggests 15 per PV, which in the current study would equal a minimum of 30 participants required. No incentives were used throughout the recruiting process. All participants were provided with a consent form containing information regarding the current study and were required to provide full informed consent and confirm their age to be above 18 years old before participating. The majority of participants recruited were part of nuclear family type (141), followed by single-parent (13), blended (4) and extended (3). A total of 59 participants were biologically firstborn, followed closely by 52 middleborn, 46 youngest, and 4 only born.

Measures

Demographics. Participants were asked for their age and gender along with family type, amount of siblings, and the age gap between themselves and their siblings (Appendix G).

Biological Birth Order. This was asked directly in the demographics section (Appendix G).

Psychological Birth Order. The Psychological Birth Order Inventory was developed by White and Campbel in 1991 to measure psychological birth order (Appendix D). It consists of 46 items rated as either yes or no. The measure is divided into four subscales of firstborn, e.g. “It is important to me to please adults”, middle born, e.g. “I am taken less seriously than anyone in the family”, youngest born, e.g. “I am babied by my family members”, only child, e.g. “My family is more involved in my life than I want”. These subscales differ for females and males, and are uneven, therefore, require standardization to facilitate comparison. The subscale that participants score the highest in, is the position that they relate to the most, regardless of their biological birth order. When tested for reliability and validity, coefficients ranged from 0.70 (only child subscale) to 0.87 (middle child scale) as noted by the authors and were consistent for five weeks (White, Campbell, & Stewart, 1995; Stewart & Campbell, 1998). Permission to use this scale was received through email (Appendix C).

Personality. The International Personality Item Pool (IPIP) was used to retrieve Goldberg’s scale of big five factor markers (Goldberg, 1992; Goldberg et al., 2006) developed to measure personality. It is a 50 item self-report measure divided into subscales for each of the five markers, extraversion, e.g. “I am the life of the party”, agreeableness, e.g. “I am interested in people”, conscientiousness, e.g. “I am always prepared”, emotional stability, e.g. “I am relaxed most of the time”, and imagination, e.g. “I have a rich vocabulary”. Each statement is to be rated

on a five-point Likert scale from 1 “Very Inaccurate” to 5 “Very Accurate”. Each with several reverse-scored questions. Scores will represent personality types, for example, a high score on the extraversion subscale indicates a higher tendency for extraversion. Coefficient alphas for subscales range from .79, .87. The big five personality test is a commonly used scale and widely accepted and is short and easily administered (Appendix E).

Design and Analysis

A quantitative, correlational approach was taken. To investigate the hypothesis, a between participants design was used. For inferential analysis, predictor variables included age, gender and biological birth order, while psychological birth order was used as a criterion variable for hierarchical multiple regression.

Procedure

Data was collected online through a google forms survey. The completed survey was piloted with 3 participants to check for the length of time to complete the survey and to check for potential issues. No issues were found and those three participants’ data were excluded from the study. The survey link was posted to various social media sites such as Facebook, Whatsapp, Instagram and Snapchat, along with a brief explanation of the study, eligibility criteria and an invitation to share with others who may be eligible. Once a potential participant clicked on the link they were met with a full information sheet (see Appendix A) consisting of the nature of the study and contact details of the author and supervisor for further questions or information. The voluntary aspect of the study was highlighted and confidentiality was outlined. Due to the anonymous nature of the data requested, once submitted, specific information could not be retrieved, this was explained in the information sheet. Informed consent was required before access to the survey was given. This was provided through two checkboxes that must be clicked

by participants to confirm that they are above the age of 18 and that they voluntarily agree to participate (Appendix A).

Participants were then asked to complete demographic information such as age, gender, sibling age gap (Appendix G), along with biological birth order (Appendix …), then the IPIP questionnaire (Appendix E) followed by the Psychological Birth Order Inventory (Appendix D). Before submitting, participants were presented with a debriefing sheet (see Appendix B), reminding them of their right to withdraw, and contact information for support services in the event of psychological distress along with a statement encouraging participants to reach out and talk to someone if needed.

The study was approved by the ethics committee at NCI and data was collected in concordance with the PSI code of professional ethics (2010). The risks and benefits were outlined and participants were informed of the NCI policy of publishing studies that score a 2.1 or above, in the NCI library.

Results

Descriptive Statistics

Out of 161 participants (116 females, 45 males), a total of 100 (62.11%), had an age gap of at least five years, while 61 participants (37.89%) had less than five years between themselves and any siblings. Descriptive statistics were carried out for all variables; frequency and valid percentage for family type and biological birth order are reported in Table 1 below; the mean, confidence intervals, standard deviation and range for continuous variables, age and number of siblings are reported below in Table 2. Preliminary analysis was performed on the data set and all variables followed assumptions of normality.

Table 1

Descriptive statistics for all categorical variables

Variable	Frequency	Valid %
Family type		
Nuclear	141	87.6
Single parent	13	8.1
Blended	4	2.5
Extended	3	1.9
Biological birth order		
First born	59	36.6
Middle born	52	32.3
Youngest born	46	28.6
Only	4	2.5
Psychological Birth Order		
First born	134	83.2
Middle born	11	6.8
Youngest born	11	6.8
Only	5	3.1

Table 2

Descriptive statistics for all continuous variables.

Variable	*M* [95% CI]	*SD*	Range
Age	39 (36.92-41.23)	13.85	54
Number of siblings	2.85 (2.55-3.15)	1.94	11
Extraversion	33.09 (31.77-34.39)	8.77	39
Agreeableness	43.32 (42.40-44.17)	5.72	31
Conscientiousness	36.80 (35.57-38.02)	7.91	36
Emotional stability	30.15 (28.62-31.51)	9.28	39
Imagination	37.00 (35.00-38.00)	6.32	27

Inferential Statistics

Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. Correlations between predictor variables and the criterion variable(s) were examined, outlined below in table 3. One out of the seven predictor variables was significantly correlated with the psychological birth order criterion variable, conscientiousness ($r=.23$, $p<.05$). The correlations amongst predictor variables were also examined, all correlations were weak to moderate with r values ranging from -.01 to -.41. Tests for multicollinearity also indicated that Tolerance and VIF values were in an acceptable range. These results indicate that there was no violation of the assumption of multicollinearity and that the data was suitable for multiple linear regression analysis.

Table 3

Correlation matrix for variables used in regression analyses

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Age	1								
2. Gender	-.01	1							
3.Extraversion	-.01	-.15	1						
4.Agreeableness	.15	-.41**	.22**	1					
5.Conscientiousness	.23**	-.02	-.12	.06	1				
6.Emotional stability	.05	.38**	.25**	-.05	.13	1			
7.Imagination	-.05	.13	.30**	.11	.03	.20*	1		
8.Biological birth order	.08	-.07	-.07	.30	.04	.02	-.07	1	
9.Psychological birth order	.04	-.03	.00	.00	-.15	.00	-.06	.09	1

Note: Statistical significance: *p < .05; **p < .01

Extraversion. Hierarchical multiple regression was performed to investigate the ability of Psychological Birth Order to predict personality extraversion, after controlling for age, gender and Biological Birth Order. Age and gender were entered at step 1, however, this model was not statistically significant, (R^2 = .02; F(2,158)=1.83; p=.164). Biological birth order was added in step 2 and did not account for any variation in extraversion scores, after controlling for age and gender (F(3, 157)=1.61, p=.189). Psychological birth order was added in step 3, however, did not account for any variance in agreeableness scores (R^2 *Change*=.00; F(4,156)=1.20, p=.312).In the final model, the control variable gender was the only statistically significant predictor, (β=-3.05, p=.050). (see Table 4 for full details).

Table 4

Hierarchical Regression Model of Extraversion

Variable	*R*	R^2	R^2 *Change*	*B*	*SE*	*β*	*p*
Step 1	.15	.02					
Age				-.01	.05	-.01	.915
Gender				-2.93	1.53	-.15	.058
Step 2	.17	.03	.01				
Age				-.00	.05	-.00	.984
Gender				-3.05	1.54	-.16	.049*
Biological birth order				-.86	.80	-.09	.280
Step 3	.17	.03	.00				
Age				-.00	.05	-.00	.983
Gender				-3.05	1.54	-.16	.050*
Biological Birth order				-.87	.80	-.09	.281
Psychological birth order				.06	.95	.01	.953

Note: R^2 =R squared; R^2 *Change= R squared change; B=unstandardized beta; SE=standardised error; β*=standardised beta; Statistical significance: *p<.05.

Agreeableness. Hierarchical multiple regression was performed to investigate the ability of Psychological Birth Order to predict personality agreeableness, after controlling for age, gender and Biological Birth Order. Age and gender were entered at step 1, this model was statistically significant, F(2,158)=18.70; p=.000, and explained 19% of the variance in agreeableness scores. Biological birth order was added in step 2, however, did not account for any variation in agreeableness scores, after controlling for age and gender (F(3,157)=12.52, p=.000).

Psychological birth order was added in step 3, however, did not account for any variance in agreeableness scores (F(4,156)=9.35, p=.000). In the final model, the control variable gender was the only statistically significant predictor, (β=-.41, p=.000). (See Table 5 for full details).

Table 5

Hierarchical Regression Model of Agreeableness

Variable	*R*	R^2	R^2 *Change*	*B*	*SE*	β	*p*
Step 1	.44	.19					
Age				.06	.03	.14	.045*
Gender				-5.24	.91	-.41	.000*
Step 2	.44	.19	.00				
Age				.06	.03	.14	.052
Gender				-5.20	.91	-.41	.000*
Biological birth order				.27	.48	.04	.570
Step 3	.44	.19	.00				
Age				.06	.03	.14	.052
Gender				-5.21	.92	-.41	.000*
Biological Birth order				.28	.48	.04	.559
Psychological birth order				-1.35	.57	-.02	.812

Note: R^2 =R squared; *R^2 Change=R squared change; B=unstandardized beta; SE=standardised error;* β=standardised beta; Statistical significance: *p<.05

Conscientiousness. Hierarchical multiple regression was performed to investigate the ability of Psychological Birth Order to predict personality conscientiousness, after controlling for age, gender and Biological Birth Order. Age and gender were entered at step 1, this model was statistically significant, $F(2,158)=1.83$; $p=.164$, and explained 5% of the variance in conscientiousness scores. Biological birth order was added in step 2 and did not account for any additional variation in conscientiousness scores ($F(3,157)=2.94$; $p=.035$). Psychological birth order was added in step 3 and accounted for an additional 2% variance in conscientiousness scores after controlling for age, gender and biological birth order (β=-1.79, $p<.034$; $F(4,156)=3.41$, $p=.011$). In the final model, age was the only statistically significant control variable (β=.13, $p<.003$). (See Table 6 for full details).

Table 6

Hierarchical Regression Model of Conscientiousness

Variable	*R*	R^2	R^2 *Change*	*B*	*SE*	*β*	*p*
Step 1	.23	.05					
Age				.13	.04	.23	.004*
Gender				-.31	1.36	-.02	.820
Step 2	.23	.05	.00				
Age				.13	.04	.23	.004*
Gender				-.28	1.37	-.02	.836
Biological birth order				.19	71	.02	.793
Step 3	.28	.08	.03				
Age				.13	.04	.23	.003*
Gender				-.34	1.35	-.02	.800
Biological Birth order				.32	.71	.04	.649
Psychological birth order				-1.79	.83	-.17	.034*

Note: R^2 =R squared; R^2 *Change= R squared change; B=unstandardized beta; SE=standardised error; β*=standardised beta; Statistical significance: *p<.05

Emotional stability. Hierarchical multiple regression was performed to investigate the ability of Psychological Birth Order to predict personality emotional stability, after controlling for age, gender and Biological Birth Order. Age and gender were entered at step 1, this model was statistically significant, F(2,158)=13.66; p=.000, and explained 15% of the variance in emotional stability scores. Biological birth order was added in step 2, however, did not account for any additional variation in conscientiousness scores (F(3,157)=9.20; p=.000). Psychological birth

order was added in step 3, however, did not account for any variance in emotional stability scores (F(4,156)=6.86, p=.000). In the final model, the control variable gender was the only statistically significant predictor of emotional stability scores, (β=.38, p=.000). (see Table 7 for full details).

Table 7

Hierarchical Regression Model of Emotional stability

Variable	*R*	R^2	R^2 *Change*	*B*	*SE*	β	*p*
Step 1	.38	.15					
Age				.03	.05	.05	.485
Gender				7.85	1.51	.38	.000*
Step 2	.39	.15	.00				
Age				.03	.05	.05	.518
Gender				7.9	1.52	.38	.000*
Biological birth order				.48	.79	.05	.543
Step 3	.39	.15	.00				
Age				.03	.05	.05	.521
Gender				7.92	1.53	.38	.000*
Biological Birth order				.48	.80	.05	.551
Psychological birth order				.08	.94	.01	.933

Note: R^2 =R squared; R^2 *Change=R squared change; B=unstandardized beta; SE=standardised error;* β=standardised beta; Statistical significance: *p<.05

Imagination. Hierarchical multiple regression was performed to investigate the ability of Psychological Birth Order to predict personality imagination, after controlling for age, gender and Biological Birth Order. Age and gender were entered at step 1, however, this model was not significant ($F(2,158)=1.48$; $p=.230$). Biological birth order was added in step 2, however, did not account for any additional variation in imagination scores ($F(3,157)=1.16$; $p=.329$). Psychological birth order was added in step 3, however, did not account for any variance in imagination scores ($F(4,156)=.95$, $p=.438$). In the final model, there were no statistically significant variables (see Table 8 for full details).

Table 8

Hierarchical Regression Model of Imagination

Variable	*R*	R^2	R^2 *Change*	*B*	*SE*	*β*	*p*
Step 1	.14	.02					
Age				-.02	.04	-.05	.531
Gender				1.77	1.11	.13	.111
Step 2	.15	.02	.00				
Age				-.02	.04	-.05	.571
Gender				1.71	1.11	.12	.125
Biological birth order				-.41	.58	-.06	.478
Step 3	.15	.02	.00				
Age				-.02	.04	-.04	.583
Gender				1.70	1.11	.12	.129
Biological Birth order				-.38	.58	-.05	.514
Psychological birth order				-.40	.69	-.05	.560

Note: R^2 =R squared; R^2 *Change= R squared change; B=unstandardized beta; SE=standardised error; β*=standardised beta; Statistical significance: *p<.05

Discussion

The current study examined the predictability power of birth orders, both biological and psychological, on personality measured using Goldberg's big five (1992). It sought to provide an insight into the validity of birth order measurements by determining the relative associations on each personality marker while controlling for age and gender. The hypothesis stated that psychological birth order will be associated with personality independently of biological birth order.

Results showed a notable difference between biological birth order and psychological birth order, with 59% of participants scoring differently on the psychological birth order inventory to their biological birth order. A weak correlation was found between psychological birth order and the personality marker conscientiousness, however, the hypothesis was not supported due to no other significant findings on correlations between either of the birth order measures and the other personality markers (extraversion, agreeableness, emotional stability and imagination).

Findings are not consistent with previous research, failing to replicate correlations of biological birth order and psychological birth order with personality. The final models in regressions for extraversion, agreeableness and emotional stability, accounted for 3%, 19% and 15% variance respectively. However, in each of these regressions, biological birth order and psychological birth order were not associated with these changes, and gender was the only variable significantly associated with a change in extraversion, agreeableness and emotional stability scores. The final model in regression for imagination, accounted for no additional variance in imagination scores, with neither birth orders nor control variables significantly associated with a change in imagination scores. The final model of regression for conscientiousness accounted for an 8% variance, with psychological birth order and age significantly associated with the change in conscientiousness scores.

The findings on gender and its association with change in extraversion are consistent with previous literature; however, the current study failed to replicate a similar direction, instead, finding females to score higher on extraversion than males (negative results for gender in regression analyses signify females as they were coded as 0) (Lynn, & Martin, 1997). The findings on gender and association with emotional stability are consistent with previous research that found males to score higher on emotional stability scales than females (Lynn, & Martin, 1997; Schmitt, 2007). The findings that females score higher on agreeableness is not consistent with previous research that found no gender differences in agreeableness (Rey, & Extremera, 2016; Field, Tobin, & Reese-Weber, 2014). Previous studies found connections between biological birth orders of later-born and agreeableness (Sulloway, 2001), which were not replicated in the current study. Previously extraversion and conscientiousness have been associated with firstborns (Sulloway, 2001); the current study's results suggest that it is participants with a psychological birth order position of firstborn that score higher on conscientiousness.

The current study failed to replicate findings of correlations between biological birth order and personality, however, there have been mixed reports, therefore, these results are not completely surprising. While the current study aimed to compare the predictability of psychological birth order against biological birth order in terms of personality, significant findings were only found when measuring conscientiousness in terms of psychological birth order. Interestingly, differing results on the biological birth order and psychological birth order scales (59%), are similar to the number of participants with an age gap of at least five years (62%). Five years is considered a substantial gap between siblings that may cause a shift in

psychological birth order (Carlson, Watts, & Maniacci, 2006). While this was not investigated in the inferential analysis for the current study, it suggests an area for further inquiry.

Implications

Understanding the impact of differences between birth orders may be important to a variety of psychological perspectives. For example, the psychodynamic perspective focuses on the early years and how variations in childhood experiences can influence behaviour later in life (Freud, 2012). The humanistic perspective heavily relies on individuals' self-image and their feelings that influence behaviour (Polkinghorne, 2001). This can lead to practical implications in counselling, where an understanding of clients and their views on their experiences is of great benefit (Forer, 1977).

Some studies highlight a connection between a decline in cognition with age, alongside these lower levels of cognitive ability, higher levels of conscientiousness are found (Soubelet, 2011). Conscientiousness has been linked to educational attainment (Hampson, Goldberg, Vogt, & Dubanoski, 2007). Gender has previously been associated with birth order in terms of areas such as intelligence (Eckstein, et. al, 2010; Kirkcaldy, Furnham, & Siefen, 2009).

The current study provides interesting results that add to research in the area of nature vs. nurture. Despite no significant correlations found concerning personality, this study highlights the need for further research into other variables and areas that may be impacted. There is an increase in studies on self-perception and an increase in the importance of it in terms of areas of mental health. Comments have been made regarding the association between personality traits and birth order, stating that this is due to competition for scarce resources, the main resource being parental investment (Sulloway, 2001). It was previously found, however, that parental differences do not account for a large percentage of "nonshared environment", a term given to

the differences between children who grew up within the same family (Plomin & Daniels, 1987; Plomin, Asbury, & Dunn, 2001). One possibility could be that birth order has shown a decrease in correlation to personality due to increased education and resources available for parents surrounding parenting. Another possibility is that there is a random distribution of personality types. Despite the current study's results now adding to the conflicting findings surrounding birth order, as Sulloway suggested (2001), meta-analyses have found sturdy results of correlations to personality (Sulloway, 1995; Eckstein, 2000; Eckstein et al.,2010).

Strengths and Limitations

There have been arguments over the small effect sizes found in birth order studies, however, taking into account the variance found due to genetics in personality traits of approximately 40%, along with approximately 20% of variance due to measurement errors, any other variance found, can be considered substantial despite seeming small (Sulloway, 2001). Therefore, despite the small effect sizes found in the current study, appearing limited at first, they may have considerable impacts.

The scale used to measure personality in the current study, the IPIP of Goldberg's big five personality markers (1992), was suited to the current study due to its accessibility and ease of application, this is a strength in terms of recruiting participants without incentive, however, future studies may use alternative scales that may provide a more in-depth view. An in-person questionnaire may be more appropriate to reach participants who may not be technology literate.

Mixed families, including blended, single-parent, and extended family types were included in the sample to present a realistic population sample, however, a more specific approach into solely nuclear families may give a better starting point, before extending to mixed family types. Mixed family types are growing in Ireland and around the world and research has

shown that these situations do not impact developmental growth negatively, the area of psychological birth order looks at the individual and their perspective within their family situation.

Strengths in the demographics of participants recruited include age, which covered a wide range, along with the range of birth orders of participants approximately even between the firstborn, middle born and youngest; only born was the lowest category recruited, however, this is also reflective of the population of Ireland.

Future Research

Despite the current study not replicating significant findings, several avenues for future research can be interpreted. Psychological birth order research may benefit from a qualitative approach, to get a better understanding of how people see themselves in their family and any areas that this might affect. As previous studies mention, the impact age appears to have on conscientiousness, could have a direct impact in areas of cognition and health (Elliott, 1992). While further research is needed, this should be an area of focus to find out why this may be and to mitigate any of these impacts.

While this study did not show psychological birth order to have an impact on other areas of personality, the differences between it and biological birth order should be researched to determine the extent of any impacts this may have. As Freud (2012) mentioned, how one views the world, and the situation or dynamic in which they are raised shapes the understanding of their environments. To progress from this study, future research would benefit from both expanding to other areas and narrowing down into nuclear families, and possibly within family designs. This general study highlights that there is a need for further studies in the area of psychological birth order to confirm and determine the extent of impacts it may have on different areas. Also, due to

the relationship found between gender and personality markers (extraversion, agreeableness, emotional stability), along with psychological birth order and conscientiousness, various gender sibling dynamics could be an interesting area of study. This may shed light on whether there are only differences in psychological birth order and biological birth order when there are certain criteria met, an example of only male siblings sticking with biological birth order, while female siblings' psychological birth order differing from their biological birth order and looking at why this may be.

Perhaps looking at psychological birth order by itself is too narrow of a field to replicate significant results, however, looking at a broader view of psychological birth order along with sibling dynamics, may provide a better insight into the impacts. As Bradley (1982) argues, birth order may be more useful in conjunction with other theories.

There is a need for more research focusing on health and mental health outcomes (Elliott, 1992). Bijur, Golding and Kurzon (1988) found that larger family size meant increased accidents, however, benefits of having siblings have been found, Downey and Condron, (2004) reported improved social and interpersonal skills in children with siblings. Another possibility is that the relationship between birth orders and other variables such as personality may be curvilinear. That different birth orders, whether biological or psychological, may lead to differing levels without an ascending or descending direction. If this is the case, then a different analysis type may be more revealing.

An interesting study to note is Rubin's (1970) investigation into the birth order of birth order researchers. It states that the majority of researchers in this area are firstborn. While Rubin's study is not recent and should be updated, it is important to acknowledge that the

researcher of the current study is also a firstborn. The biases that this may add, however, are not in favour of firstborns, but of later-borns.

Conclusion

This study aimed to determine the difference in the predictability of biological birth order against psychological birth order in terms of personality, while no significant correlations were found between either scale and the measure of personality, a difference in results of the scales themselves was found. This highlights a need for more research into other areas that this difference may impact. Significant outcomes were found in the control variables of age and gender.

Contrary to previous studies, this study showed no significance in the correlations between biological birth order and personality, therefore the hypothesis was not supported. Reasons for this may include a need for a more in-depth measure of personality. There was however, a significant correlation found between psychological birth order and consciousness, while this was small, effect sizes concerning birth order characteristics are found to be substantial despite appearing small. Findings suggest a need for further investigation into why psychological birth order may differ from biological birth order, and how this difference can be used to benefit areas such as parenting, health and counselling.

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Appendices

Appendix A-Information/Consent Sheet

You are being invited to take part in a research study. Before deciding whether to take part, please take the time to read this document, which explains why the research is being done and what it would involve for you. If you have any questions about the information provided, please do not hesitate to contact the researcher or supervisor using the details at the end of this sheet.

What is this study about?

I am a final year student in the BA in Psychology programme at National College of Ireland. As part of our degree we must carry out an independent project. The project will be supervised by Dr. Matthew Hudson.

For my project, I aim to investigate whether psychological birth order or biological birth order is a better predictor of personality types. (Biological birth order: the position that you are born into; Psychological birth order: the position in which you see yourself when relating to your family members)

What will taking part in the study involve?

If you decide to take part in this research, you will be asked to:

Complete an online questionnaire based on biological birth order (position you are born into), psychological birth order (how you relate to family members) and personality types.

Who can take part?

You can take part in this study if you are aged over 18.

Do I have to take part?

Participation in this research is voluntary; you do not have to take part, and you may withdraw at any time. A decision not to take part, or to withdraw, will have no consequences for you. If you do decide to take part, information will be anonymous. Once you have submitted your questionnaire, it will not be possible to withdraw your data from the study, because the questionnaire is anonymous and individual responses cannot be identified.

What are the possible risks and benefits of taking part?

There are no direct benefits to you taking part in this research. However, the information gathered will contribute to research that helps us understand the impact of psychological birth order and biological birth order on personality.

There is a small risk that some of the questions contained within this questionnaire may cause minor distress for some participants. If you experience this, you are free to discontinue participation and exit the questionnaire. Contact information for relevant support services are also provided at the end of the questionnaire.

Will taking part be confidential and what will happen to my data?

The questionnaire is anonymous, it is not possible to identify a participant based on their responses to the questionnaire. All data collected for the study will be treated in the strictest confidence.

Responses to the questionnaire will be stored securely in a password protected file on the researcher's computer. Only the researcher and their supervisor will have access to the data. Data will be retained for 5 years in accordance with the NCI data retention policy.

What will happen to the results of the study?

The results of this study will be presented in my final dissertation, which will be submitted to National College of Ireland.

Who should you contact for further information?

Researcher: Ali Clarke - finalyearpsychologyproject@gmail.com

Supervisor: Dr. Matthew Hudson - Matthew.Hudson@ncirl.ie

By clicking the “Yes” button below you are consenting that you are over 18 years of age.

By clicking the “Yes” button below you consent that you have read the above information regarding the nature and purposes of this study and you wish to partake in this study.

Appendix B-Debriefing Sheet

Thank you for completing the questionnaire for this study measuring the predictability values of psychological birth order and biological birth order on personality types.

To withdraw from this study: close down your web browser now.

To submit your response: please click the "submit" button below.

The questionnaire is confidential and anonymous, therefore, submitted responses cannot be withdrawn or removed as the responses will be stored among a pool of anonymous data and your answers will not be able to be identified or retrieved. The information gathered from this questionnaire will solely be used for my thesis and no further studies. However, if my final project surpasses a grade of or above a 2.1 it will be published in the NCI library. The data collected will be stored for 5 years in accordance with NCI policies, after this period, all data from this study will be destroyed.

In the event that you felt psychological distress as a result of taking part in this questionnaire, we encourage you to speak out to your family, friends and/or guardians. Helpline phone numbers are provided below to allow you to seek additional support if needed.

Support Services:

NiteLine: 1800 793 793

SpunOut Text line: text SPUNOUT or TALK to 086 1800 280

The Samaritans: (01) 872 7700; 116 123

Pieta House: 1800 247 247

Aware Support Line: 1890 303 302;1800 80 48 48

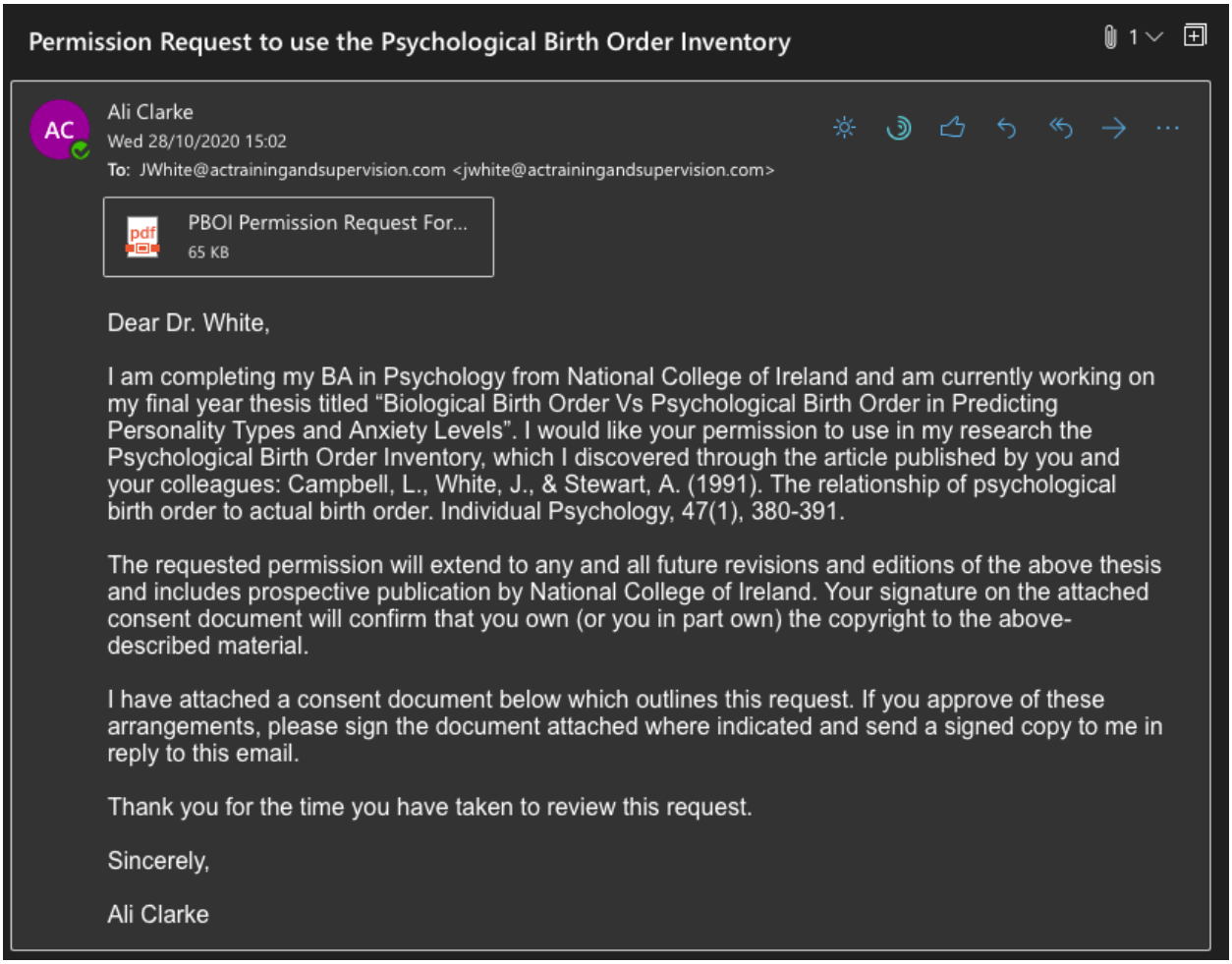
Contact Information:

If you have any concerns or questions on the use of this data, or if you have any further questions about this study, please feel free to contact:

Researcher: Ali Clarke - finalyearpsychologyproject@gmail.com

Supervisor: Dr. Matthew Hudson - Matthew.Hudson@ncirl.ie

Appendix C-Permission to use PBOI



Permission Request to use the Psychological Birth Order Inventory

1

AC

Ali Clarke
Wed 28/10/2020 15:02
To: JWhite@actrainingandsupervision.com <jwhite@actrainingandsupervision.com>

PBOI Permission Request For...
65 KB

Dear Dr. White,

I am completing my BA in Psychology from National College of Ireland and am currently working on my final year thesis titled "Biological Birth Order Vs Psychological Birth Order in Predicting Personality Types and Anxiety Levels". I would like your permission to use in my research the Psychological Birth Order Inventory, which I discovered through the article published by you and your colleagues: Campbell, L., White, J., & Stewart, A. (1991). The relationship of psychological birth order to actual birth order. Individual Psychology, 47(1), 380-391.

The requested permission will extend to any and all future revisions and editions of the above thesis and includes prospective publication by National College of Ireland. Your signature on the attached consent document will confirm that you own (or you in part own) the copyright to the above-described material.

I have attached a consent document below which outlines this request. If you approve of these arrangements, please sign the document attached where indicated and send a signed copy to me in reply to this email.

Thank you for the time you have taken to review this request.

Sincerely,

Ali Clarke

JW

JoAnna White <jwhite@actrainingandsupervision.com>
Fri 30/10/2020 14:59
To: Ali Clarke

Yes, I approve.

JW

JoAnna White <jwhite@actrainingandsupervision.com>
Sat 07/11/2020 21:46
To: Ali Clarke

It's fine to go ahead with just my permission.

Appendix D-Psychological Birth Order Inventory

This section will look at how you relate to other family members. Please read each statement and mark "Yes" or "No" according to how you feel/felt when living with your family. If you have lived with several families, please think of the one family with whom you spent the most time. If you have no siblings, you may skip items that refer to experiences with siblings.

1. I believe my parents have high expectations of me.
2. I am babied by my family members.
3. My family is more involved in my life than I want.
4. It seems like I am in a race trying to catch up.
5. It is important to me to please adults.
6. My family does not respect my privacy.
7. I feel isolated from others.
8. It is easy to talk my brothers and sisters into giving me things.
9. My parents worry a lot about me.
10. I am taken less seriously than anyone in the family.
11. It is important to me to advise my brothers and sisters about right and
12. I am seen as being the most charming in the family.
13. It seems like I never have my parent’s full attention.
14. My parents try to control me.
15. I am more organized and structured than others in my family.
16. I am pampered by my family members.
17. Other family members see me as the least capable.
18. It is important to me that others do things right.

19. My parents try to manage my life.

20. I am good at getting others to do things for me.

21. It seems like I am less important than other members of my family.

22. I want to satisfy my parents.

23. My parents want to know about everything that is going on in my life.

24. It is easy to talk my parents into giving me things.

25. I often feel less loved than others in my family.

26. I feel smothered by my parents.

27. It is important to me to do things right.

28. When I want to I can be the ruler of the family.

29. I often feel that I am treated more unfairly than others in the family.

30. I am good at getting what I want from my family.

31. I feel like I live in a fishbowl.

32. It is important to me to make good grades in school.

33. I feel disconnected from others in my family.

34. My parents consider everything that is my business, their business.

35. It is important to me to be the best.

36. I can be the boss in the family when I want to.

37. I feel squeezed out by my brothers and sisters.

38. My parents are busybodies.

39. I like order more than other people in my family.

40. I am seen as the most adorable in the family.

41. It is important to me that my brothers and sisters do things right.

42. I am treated less justly than others in my family.

43. I want others in my family to do things properly.

44. I feel like I am less valuable than other members of my family.

45. I like doing things the correct way.

46. I feel left out by my brothers and sisters.

Appendix E-IPIP Big Five

Please read each question below and rate on the scale of 1-5 how accurately you believe each statement describes you (1-Very Inaccurate, 5-Very Accurate).

1. I am the life of the party.
2. I feel comfortable around people.
3. I start conversations.
4. I talk to a lot of different people at parties.
5. I don't mind being the center of attention.
6. I don't talk a lot.
7. I keep in the background.
8. I have little to say.
9. I don't like to draw attention to myself.
10. I am quiet around strangers.
11. I am interested in people.
12. I sympathize with others' feelings.
13. I have a soft heart.
14. I take time out for others.
15. I feel others' emotions.
16. I make people feel at ease.
17. I am not really interested in others.
18. I insult people.
19. I am not interested in other people's problems.

20. I feel little concern for others.

21. I am always prepared.

22. I pay attention to details.

23. I get chores done right away.

24. I like order.

25. I follow a schedule.

26. I am exacting in my work.

27. I leave my belongings around.

28. I make a mess of things.

29. I often forget to put things back in their proper place.

30. I shirk my duties

31. I am relaxed most of the time.

32. I seldom feel blue.

33. I get stressed out easily.

34. I worry about things.

35. I am easily disturbed.

36. I get upset easily.

37. I change my mood a lot.

38. I have frequent mood swings.

39. I get irritated easily.

40. I often feel blue.

41. I have a rich vocabulary.

42. I have a vivid imagination.

43. I have excellent ideas.

44. I am quick to understand things.

45. I use difficult words.

46. I spend time reflecting on things.

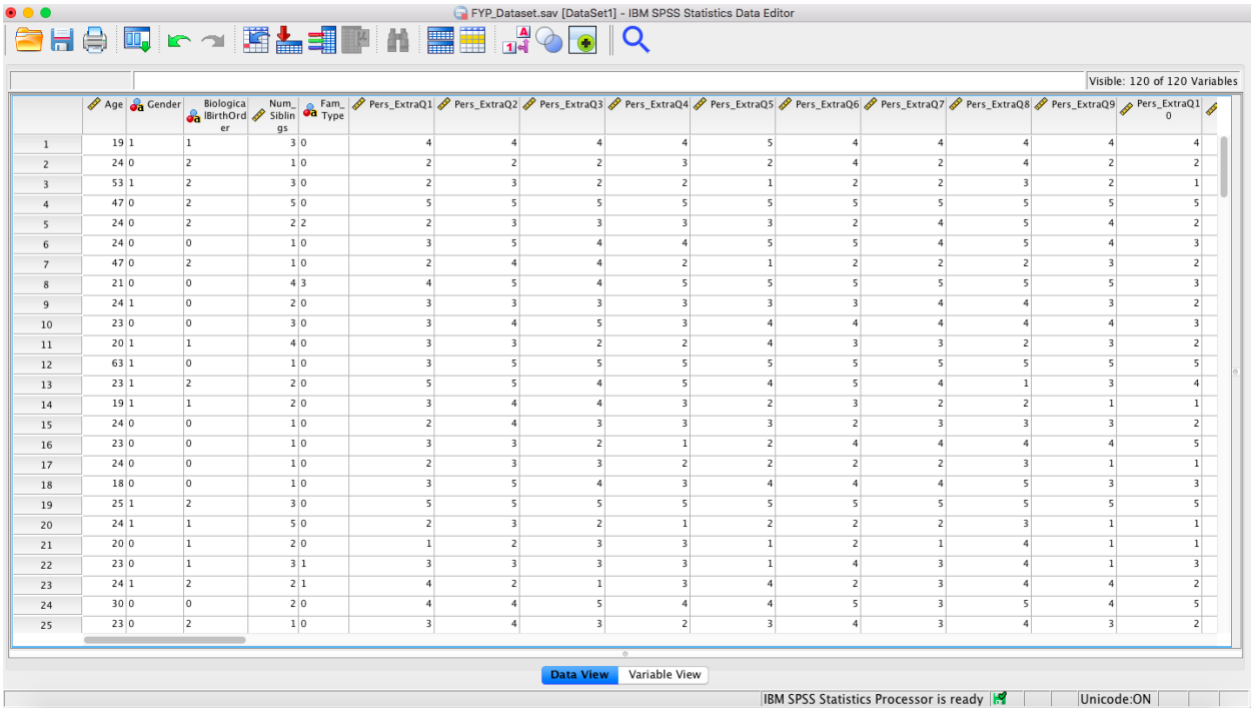
47. I am full of ideas.

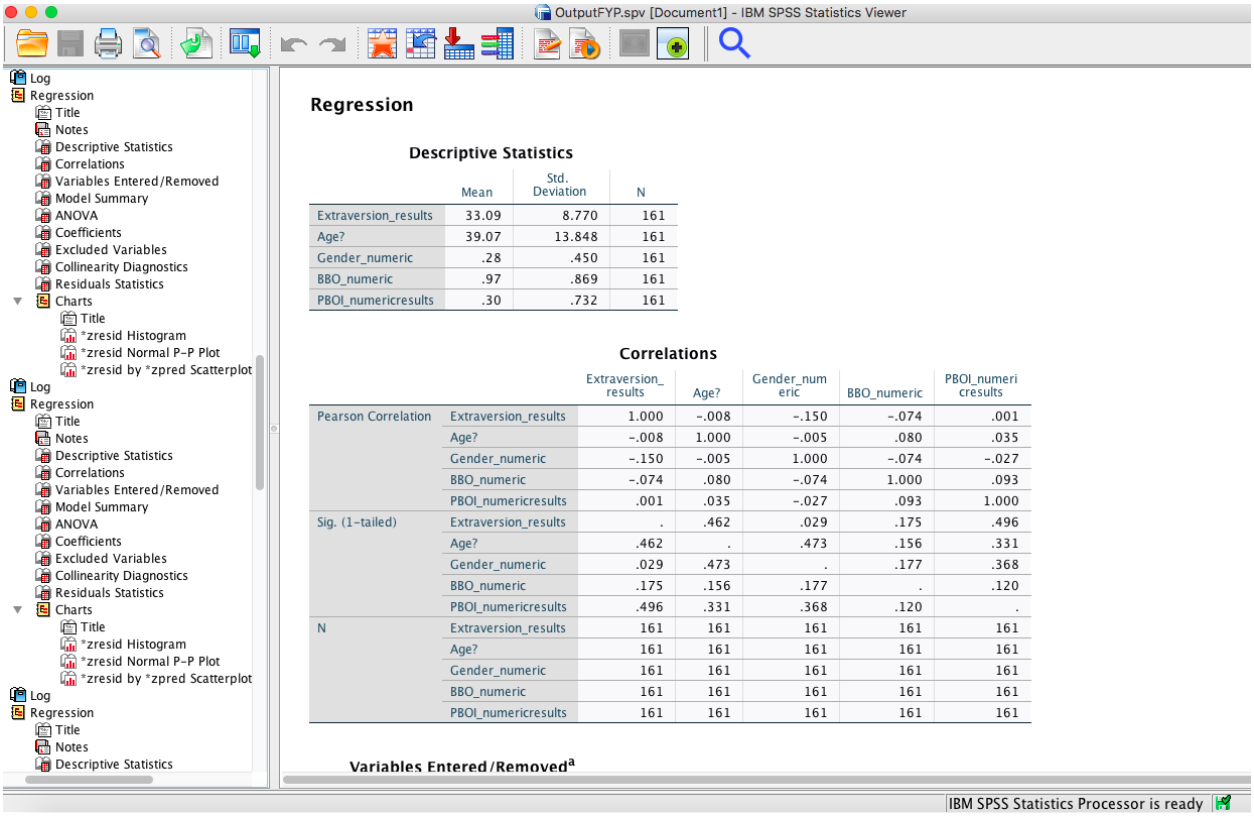
48. I have difficulty understanding abstract ideas.

49. I am not interested in abstract ideas.

50. I do not have a good imagination.

Appendix F-SPSS Datafile & Output





Appendix G-Demographic questionnaire

Age?

Gender/Sex?

Female/Male/Other

Biological Birth order?

Firstborn/Middleborn/Youngest/Only child

How many siblings do you have?

Which option best describes your family situation growing up?

Nuclear (Living with 2 parents) / Blended (Living with step-parents and/or step/half siblings) / Single parent (Living with 1 parent) / Extended (Living with extended family members)