

Personality Similarities and Differences within Families

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Abstract

The following paper details a study conducted through a survey about personality type differences within families. The main goals were to see if significant patterns existed in personality types within families and to promote self-reflection on personality type in participants. Survey participants were directed to take the 16 Personalities test online, which is a free Myers-Briggs like Type Indicator. Participants were anonymous but connected their surveys to their families' through a unique family code. Patterns in personality type were analyzed based on the participants' answers to a free response question about what family position they held and who they participated with. Through the Chi-Squared Test of Independence, no significant correlations between family position or personality type/traits could be identified, however, the sample size of 56 participants was not large enough for the tests to be reliable. For this reason, comparisons were made mostly through data visualization, with emphasis on how patterns identified in that way should only be considered potential hypotheses for future studies with higher sample sizes. The patterns identified were that mothers and fathers had a tendency to be in the Sentinel and Diplomat personality categories, respectively, with seven out of 10 participating mothers being in the Sentinel category, and five of seven fathers being in the diplomat category. No significant personality types were found for any of the birth positions, but every birth order position did show a preference for specific letters in the personality type based off of the data visualization. The third letter (associated with Feeling vs Thinking) showed the most differences, with 31 out of 48 family comparisons having the third letter differ. The results for the self-reflection portion were generally positive and showed that the survey likely succeeded at promoting self-reflection in the participants, with 78% of participants saying they were likely or very likely to have a conversation with their family about their personality.

Personality Similarities and Differences within Families

Personality psychology and genetics have long been two separate fields, with the few studies in which they merged having proved for it to be extremely difficult in drawing significant conclusions about the strength of their relationship. This is due to the fluidity of personality, as well as the many factors that can affect it, both within the genome and environmental factors. This research study aimed to take another step towards learning more about the complex relationship between genetics and personality.

There is little to no solid evidence of the genetic influences on personality, but we are entering a new era of genetic technology, where we may soon be able to identify more subtle impacts of the human genome on personality. For example, in a Genome-Wide Association Study conducted with 63,030 participants, no significant Single Nucleotide Polymorphisms (SNPs) in the data were detected, meaning there wasn't a specific location in the human genome at a nucleotide level that likely codes for extraversion. However, on a gene level, there was one significant hit for a noncoding RNA site that still has an unknown function. Additionally, within the top 30 genes that showed some significance, four of them have been identified in other studies as having a heavy correlation with disorders such as schizophrenia, bipolar disorder, and substance abuse issues, all of which are highly heritable and associated with an extroverted personality. (Berg et al, 2016). That begs the question: is the heritability of these disorders tied to the heritability of extraversion as well? To answer questions like this, more research needs to be conducted on patterns of heritability and personality.

The study that the following paper details was by no means designed to answer the question of the heritability of genetics, but rather add to the growing knowledge of personality, so that one day, it may be a little easier to make these complex connections. This study was

intended to identify personality similarities and differences within families, specifically between siblings, and parents and their children. These groups were chosen in order to look more closely at the potential genetic influence on personality, with the passing of traits from parent to child, as well as to compare the results to the extensive literature on sibling personality differences.

Patterns in sibling personality traits have been a long-studied area of personality psychology. Adler was the first to propose the birth order theory, coming up with traits that were typically associated with specific birth order positions (Adler, 1918, as cited in Cotteril, 2022). However, Cotteril (2022) notes that the birth order theory tends to only hold true when siblings compete for their parents' attention, meaning that they do not have large age gaps and spend the majority of their adolescences in their sibling's presence. Therefore, sibling competition drives trait differentiation within siblings, not just their shared genetics.

This is not an uncommon theme in nature, as animals often must compete for food or shelter, sometimes adapting in order to do so, being the driving factor in evolution. In today's society, competition between siblings doesn't seem to be quite so simple or animalistic, but some, like Frank J. Sulloway, argue that personality trait differentiation should be considered as the same process. Though siblings may not necessarily be competing for food or a place to sleep, they are competing for parental attention that will help them to mature and become "successful" members of society. Sulloway describes the birth order theory as a way for children to occupy different niches in their environment (Hertler, 2017). In nature, every organism's sole purpose is to survive until they can produce viable offspring, and to do that, they need to find a supply of everything necessary for them to do so. This is called a niche, and different organisms survive better in different niches. But when another organism invades a niche that is already occupied,

they may find it difficult to obtain all of their survival requirements, so it is often better to adapt to fit an unoccupied niche rather than fight over the limited resources of another niche.

In human households, niches are better thought of as different paths to get attention from parents. The first-born will typically fill the easiest niche available to them to get their parents' attention, and that is simply to behave in the way their parents want them to. When the second-born comes around, that niche has already been occupied, and it would be a waste of energy to try and compete with their older sibling for that type of attention, so they learn to find other ways to get their parents' attention. This typically leads them to be more curious, outgoing, and rebellious, in comparison to their older sibling.

Another thing that happens in nature is that organisms will often have a group of offspring that are very different from each other, as a way to "hedge their bets," so that at least one of them will survive (Hertler, 2017). For example, a plant may produce seeds that will all mature and sprout at different times in the season. This way, if a severe drought were to occur, there is more of a chance that one of the seeds will sprout late enough to avoid the drought and survive. This is another major step in trait differentiation and evolution. In humans, perhaps it is the innate sense of survival that drives us to produce children with differing traits.

While the sibling dynamic and birth order theory is well studied, very few parent-child personality dynamics are published. Associations between parental differential treatment between siblings and siblings' personality have been made, but little concrete data on parents and child similarities has been collected (Vrolijk et al., 2022) Another goal for this research was to learn more about this less studied side of personality, in hopes that as technology progresses, more can be learned about how parents may or may not pass on their personality to their children.

The Personality Test

This study utilizes 16 Personalities, a free and informative personality test website created by NERIS Analytics Limited. 16 Personalities is a Myers-Briggs like personality test, in that it uses letter combinations to describe personality traits. However, the actual categories that each letter is associated with are based on the Big Five personality traits, a more modern model of personality research compared to the Myers-Briggs Type Indicator (MBTI). While the MBTI has four letters, 16 Personalities uses five to capture each aspect of the Big Five traits. These aspects are named Energy, Mind, Nature, Tactics, and Identity. (NERIS Analytics Limited, n.d). More detailed information on each of these categories can be found on the 16 Personalities website, which can be found at www.16personalities.com.

The first aspect, Energy, is based on social interactions with other people, where a person can be an Introvert or an Extrovert. The second aspect, Mind, identifies how information is processed, where a person can be Observant or Intuitive. The third aspect, Nature, describes emotional coping and decision skills, where a person can be either Thinking or Feeling. The fourth aspect, Tactics, determines the methods that people organize and plan with, in which a person can be Judging or Prospecting. The final aspect, Identity, focuses on confidence, in which a person can be either Assertive or Turbulent. The first four aspects are used to determine the personality type assigned to the test taker, and the fifth aspect is just an additional metric added on to the end of the four-letter combination (NERIS Analytics Limited, n.d).

This leaves for a total of 16 different personality types associated with the different letter combinations, and each personality type can be either Assertive or Turbulent. These 16 types are

also organized into four different groups called roles, which represent typical ambitions and interests for the personality types. In this paper, the term roles is interchangeable with “personality categories”. The roles are determined by specific two-letter combinations within the full four-letter personality type. This study uses both the personality types, and the roles set forth by 16 Personalities when analyzing patterns within family members.

It must be noted that personality types should not be solely used to define a person and their traits. Each aspect of the 16 Personalities test is simply a tendency that the taker has to behave in certain ways. The traits are by no means solid or defining. Using the descriptive words given by personality tests as concrete labels may cause people to take them too literally. This has the potential to cause discrimination based on personality traits, especially negative ones. Just because a certain trait seems undesirable does not mean that the person is wholly undesirable. This mentality is what promotes the thought that personality is set in stone, and that a person cannot grow into or out of traits. This is also why many people argue that personality tests have no place in the work environment, especially when gauging how suitable a person may be for a specific job (Blinkhorn et al., 1992). They can lead to discrimination to the hiring process.

This paper will discuss personality tendencies using the phrase “Personality Type,” but even though a person is labeled with a certain personality type, each aspect has a unique spectrum that a person can be on. For example, someone with a Feeling nature could be less of a Feeler than another person with the same label. For this reason, not all persons with the personality type INFJ are the same, they just have similar general tendencies. Personality testing should be a positive exploration of different facets of identity, not a specific labeling process .

The Importance of Self Reflection

In addition to observing personality dynamics within families, one of the prime goals for this study was to inspire interest in personality types and the self-reflection thinking about them promotes, for both participants in the study, and readers of the final research. There are many reasons why knowing about one's personality tendencies can be beneficial, such as allowing them to live a happier and healthier lifestyle.

Nowak (2013) describes how people who only think about their actions and thoughts in low level terms are focused on self-integration, or the building of their "self." On the other side, people who can think about their actions and thoughts on a higher level are able to move past self-integration, and instead focus on self-expression. Being able to analyze yourself and how you behave can help you to not only learn about your personality, but also to build upon it and expand it until you feel that your "self" is sufficiently expressed. (Nowak, 2013) Personality is our biggest form of self-expression to the world, and being able to constructively think about it can help us to better understand ourselves and better express to the world who we would like to be.

Knowing about our personality tendencies may also have an impact on our physical health. As genetic technologies have begun to grow, so have our applications for them in the medical field. We are now able to tailor medical treatments directly to patients based on their genetics. Although personality has yet to be proven as highly correlated to genetics, it can still help medical professionals to treat their patients in the most efficient way. A study performed on 96 heart failure patients showed that there may be some benefit to personalizing education about post heart failure practices to patients so that they may better absorb the information and be less likely for readmission. Additionally, of the 96 heart failure patients, most of them fell into four

specific MBTI personality types of the 16, with preference for Extroversion, Sensing, Feeling, and Judging (Gilotra et al., 2017). Certain personality traits can lead to specific lifestyles, which greatly impact our physical health. Understanding our personality tendencies has the potential to act as a preventative measure for health issues associated with certain lifestyles.

Additionally, whether in the workplace or with family, knowing your intrapersonal/personal strengths and weaknesses can be extremely helpful in learning to communicate better with others, especially those who have different communication styles than you. As previously stated, people shouldn't be labeled in the workplace or in their family as being a specific personality type, but understanding personality tendencies can promote improvements in communication, which can in turn help better relationships, training and teaching efficiency, and even community growth. Being able to understand more about why and how a person conducts themselves may help us all to learn to come together and solve the many problems that our society faces.

Research Questions

The overarching question that this study aimed to answer was as following:

- Does there exist patterns in either similarities or differences in personality between family members, across different types of families?

Additionally, the following are hypotheses that were developed prior to the study by the researcher about specific patterns within families:

- Parents and children will have specific letters within the five-letter combination that tend to be the same. For example, the first letter of the five-letter combination tends to be the same between family members.
- Families will have an even spread of personality types across the four personality categories.
- Families will have siblings with differing personality types, that also align with the Birth Order Theory.

Methods

Survey Component

The survey was conducted through Qualtrics, using a free student account from Colorado State University. The survey was designed so that each participating family member would take their own survey, allowing for privacy between family members, if desired. Families' surveys were instead to be connected by a code that each member puts into their survey, so that the surveys could be organized by during data analysis. No identifying information was collected. The survey was distributed through the social media accounts of the researcher, as well as through flyers posted around the Colorado State University campus. Both the survey workflow and the flyer can be found in the Appendix section of this paper.

Participants were first shown the consent information, documenting that they understood how the data would be used, and that they verify that they are of 18 years of age or older. Participants were then brought to the General Instructions. These detailed how participants would be directed to the 16 Personalities webpage to take the MBTI-like personality test and

what the remainder of the survey contained. Participants would then have to find their way back to the survey to continue. Qualtrics would not allow an imbedded link in the survey, so participants were instructed to either copy and paste the link for the personality webpage, or search for it on their own internet browser. This feature did cause some confusion, as a few people emailed with questions on getting to the survey link. This may have negatively affected the number of people who completed the survey. Once finished, participants could move to the family code portion of the survey, where they were instructed on how to build a four-character code that would be unique to their family. Family members would link their surveys together using the family code, allowing participants to stay anonymous while still having their surveys be connected.

Participants were then asked the five-letter personality type that they were given by the 16 Personalities webpage, their gender, and an open response question for them to explain their position in the family. It was recommended that participants include things like what family members they were participating with (without using any names), how many siblings they have, their birth order position, and any other information that they felt would help the researchers map out the family. Step and adopted family members were encouraged to indicate the age at which they began living with the family they were participating with. Two example responses were provided to help participants understand the prompt.

Finally, participants were asked some general reflection questions about the personality test. These asked whether they read about their personality type, and if they did, how accurately they thought it was in capturing their personality. They were also asked if they felt they would have a conversation with their family about their personality type and if they were likely to use what they learned about their personality type in their everyday life. This concluded the survey,

showing participants a thank you note, as well as a link to a google form where they could provide their email if they would like the general findings of this research sent to them after the study is concluded. Since one goal of this study was to promote interest in personality type and self-reflection, a more family friendly version of this paper will be sent to those participants, alongside this paper, to further encourage learning about personalities.

Participants

The survey had a total of 56 usable responses, in which enough information was provided to determine both the participant's personality type and family position, as well as if they spent enough time with the other members of their family during any of the children's adolescences to be considered to have an impact on their personality. The survey respondents made up a total of 21 different families, ranging from two to five members. Figure 1 shows the total personality type distribution across all the personality types based on the first through fourth letters of the personality types.

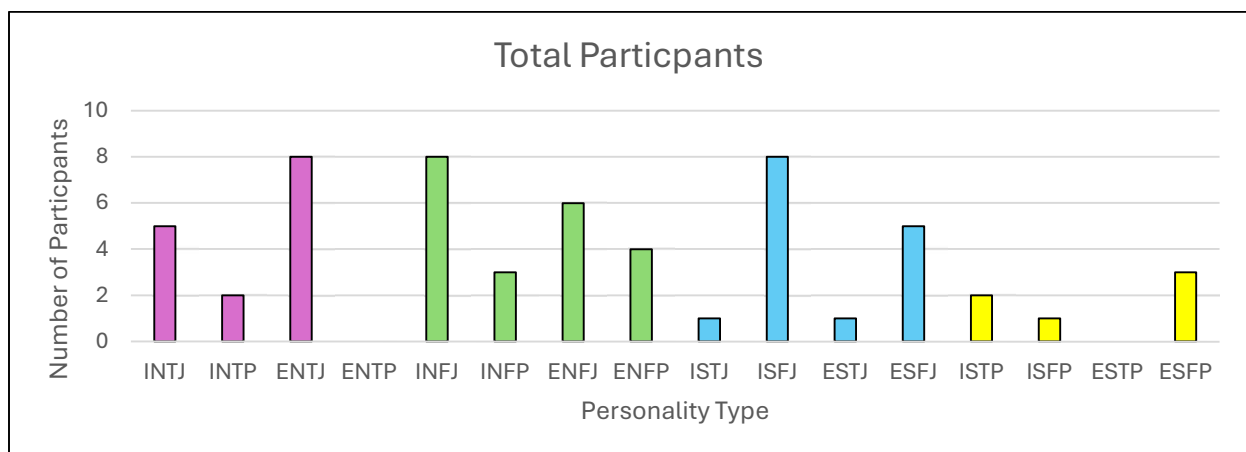


Figure 1: Personality type distribution of all participants. The colors are associated with the personality categories.

From left to right, these are Analyst, Diplomat, Sentinel, and Explorer.

There was not an even distribution of personality types, however the personality categories were slightly more even. The Analysts, Diplomats, and Sentinels had a total of 15, 21, and 15 participants, respectively, while the Explorers only had six. Of the survey participants, 10 were mothers, seven were fathers, and 39 were children. The fifth letter had an extremely uneven distribution, with 34 participants with Turbulent (or T) and 19 participants with Assertive (or A). The remainder of the responses did not include the fifth letter.

Results

Data Analysis

The data analysis began by going through survey responses and removing any that were missing the family code or the five-letter personality type. Additionally, any responses that didn't have a family code that matched other participants were deleted. The usable survey responses from Qualtrics were then organized into their family groupings based on the four-character family code in an Excel spreadsheet. Each family had their own sheet within the file, with each sheet name being their family code. A fictitious example family sheet is provided in Figure 2. Participants were then assigned a family position based on the information that they provided in the free response question. Family position was either Mother or Father for the designated parents, or birth order position and gender for designated children. Twins were marked as Twin One or Twin Two (and their birth order if other siblings exist). If no birth order was provided, each sibling was just assigned a number to differentiate them during later analysis. Stepparents or stepchildren were marked as such.

	A	B	C	D	E	F	G	H	I	J	K	L
1	Family Position	Mother	Step-Father	1st born-Male	2nd born-Female		Mother and 1st born have 1st and 5th letter the same					
2	Personality Type	ISFJ-A	ENFP-T	INTP-A	ESFP-A		Mother and 2nd born have 2nd and 3rd letter the same					
3												
4	Personality Category	Sentinel	Diplomat	Analyst	Explorer		Step-Father and 1st born have 2nd and 4th letter the same					
5	Personality Name	Defender	Campaigner	Logician	Entertainer		Step-Father and 2nd born have 1st, 3rd, and 4th letter the same					
6												
7							1st born and 2nd born have 4th and 5th letter the same					
8												
9	Step Father Moved in when 1st born was 3 years old											
10	1st Born and 2nd born are 2 years apart											
11												
12												
13												
14												

Figure 2: Example family data sheet in excel. Includes only fictional data. Highlighted colors are correlated with personality category

Most participants provided enough information for a general family position to be confidently assigned. Some responses that were missing important information such as their birth order position were still included if another family member's response filled in the missing information. Any participants whose family position was unclear was marked with an "Unknown," and any participants who had complexities to their family position were marked with an asterisk, and the complexity was recorded elsewhere on the family's sheet. Any unknown data was to be left out of the final statistics.

After the family mapping was completed, each member had their five-letter personality type from the 16 Personalities test recorded, along with the personality category. There are four personality categories, based on specific two letter combinations. Each one has its own color associated with it on the website and each family member's data was highlighted in Excel with this color for ease of differentiation during analysis. Family members whose data were not to be used were not highlighted to identify it as excluded data. Each personality type is also assigned a name by the 16 Personalities website that was recorded in Excel.

Next, any unused data was identified within each family. This was decided by whether the family member was likely to have had little or no impact on the rest of the family members' personality types. For example, a stepfather who is participating with his adult stepchildren and their mother, but who only recently married into the family, would not have been present during the children's adolescence, and likely wouldn't have had an impact on their sibling/parent dynamic. This study focuses on personality as it relates to parent and sibling dynamics, so anyone who wasn't present for the designated "childrens'" adolescences wouldn't have had an impact on that dynamic and was therefore excluded from final data analysis.

Finally, the Chi-Squared values were calculated for both family position vs. personality type and family position vs. each individual trait, according to the Chi-Squared Test of Independence. Table 1 and 2 show these values, respectively. The critical value for family position vs. personality type for a 95% confidence interval was 24.996. The critical value for family position vs. each individual trait for a 95% confidence interval was 3.841.

Family Position	χ^2
Mothers	0.103931
Fathers	0.092924
Total Children	0.003855
1st Born	0.922777
2nd Born	0.737691
3rd Born	0.552222
4th Born	0.982697
5th Born	0.445605
Only Child	0.586234

Table 1: Chi-Squared values for each family position in comparison to the 16 different personality types. The critical value is equal to 24.996 with 15 degrees of freedom.

Family Position	I vs. E	N vs. S	F vs. T	J vs. P	T vs. A
Mothers	1	0.011412	0.05778	0.05778	0.317311
Fathers	0.705457	0.008151	0.256839	0.058782	0.705457
Total Children	0.42334	0.006485	0.149541	0.006485	0.060896
1st Born	0.205903	0.205903	0.205903	0.205903	0.205903
2nd Born	0.10247	0.414216	0.10247	0.414216	0.414216
3rd Born	0.654721	0.654721	0.179712	0.025347	0.317311
4th Born	1	0.10247	0.414216	0.414216	0.563703
5th Born	0.317311	0.317311	0.317311	0.317311	0.317311
Only Child	1	0.157299	1	0.01573	0.157299

Table 2: Chi-Squared values for each family position in comparison to each of the five traits. The critical value is equal to 3.841 with 1 degree of freedom.

Personality Results

Of the 10 mothers that participated, seven were in the Sentinel personality category, and four of those were specifically ISFJ, otherwise known as Defenders. The mothers' personality distribution can be seen in Figure 3. On an individual trait level, nine of the 10 participants preferred Observant over Intuitive (S vs. N for the second letter), eight of the 10 preferred Feeling over Thinking (F vs. T for the third letter) and eight of the 10 preferred Judging over Prospecting (J vs. P for the fourth letter). There was not enough data to determine a preference for the first or the fifth letter. According to the Chi-Squared values, there was no significant preference for any personality type or individual traits.

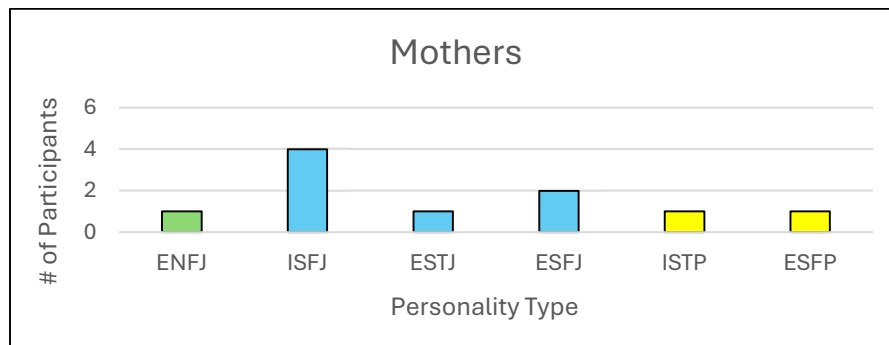


Figure 3: Personality type distribution of participants labeled as mothers. The colors are associated with the personality category. From Left to Right, these are Diplomat, Sentinel, and Explorer.

Of the seven fathers that participated, five of them were in the Diplomat personality category, and three of those were specifically ENFJ, otherwise known as Protagonists. Their data is shown in Figure 4. All seven preferred Intuitive over Observant (N vs. S for the second letter), five of the seven preferred Feeling over Thinking (F vs. T for the third letter), and six of the seven preferred Judging over Prospecting (J vs. P for the fourth letter). There was not enough data to determine a preference for the first or the fifth letter. According to the Chi-Squared values, there was no significant preference for any personality type or individual traits.

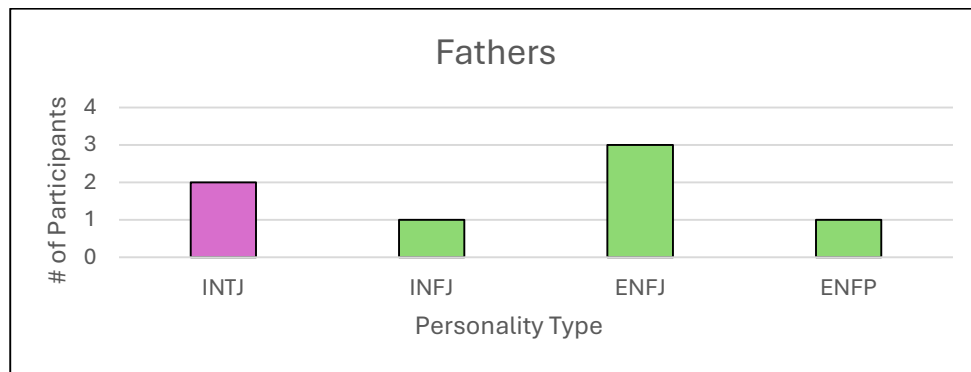


Figure 4: Personality type distribution of participants labeled as Father. Colors are representative of personality categories. From Left to Right, these are Analyst and Diplomat.

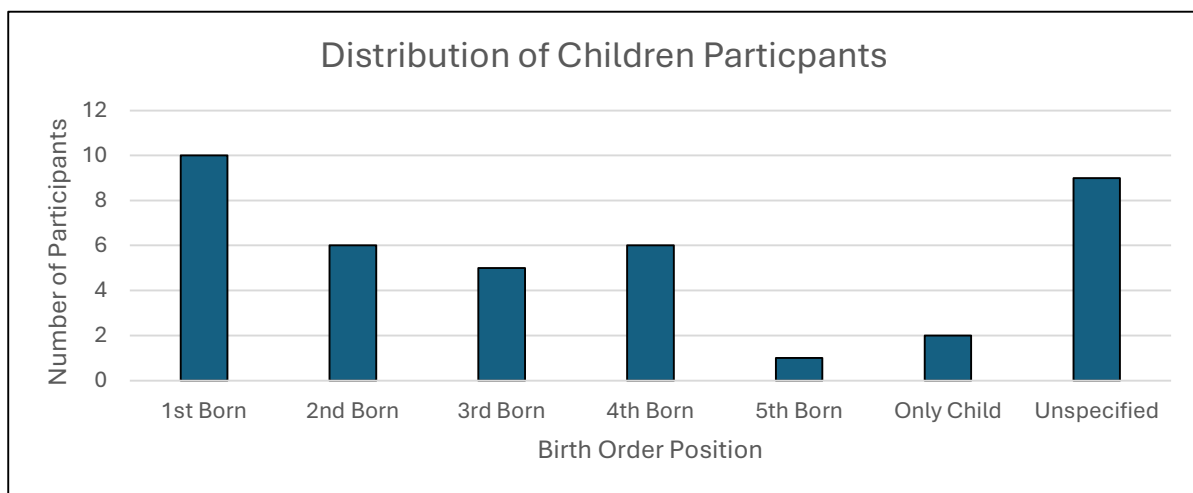


Figure 5: Distribution of participants labeled as children based on their birth order position.

Figure 5 shows the distribution of the participants labeled as children based on their birth order position. There were almost as many unspecified children as there were first-borns, so it would be beneficial in another study to ensure that all participants provide their birth order position for better results. There appeared to be no preference for a specific personality type. However, there was a larger number of first-born children who were in the Analyst personality category compared to the other categories, with five of 10 being in the Analyst category. Figure 6 compares the total children in each of the four personality categories to the number of first-born children in each category. This data shows a potential correlation between being a first-born child and being in the Analyst personality category. For second through fifth-born children, there were less participants in the Analyst category compared to the other three categories.

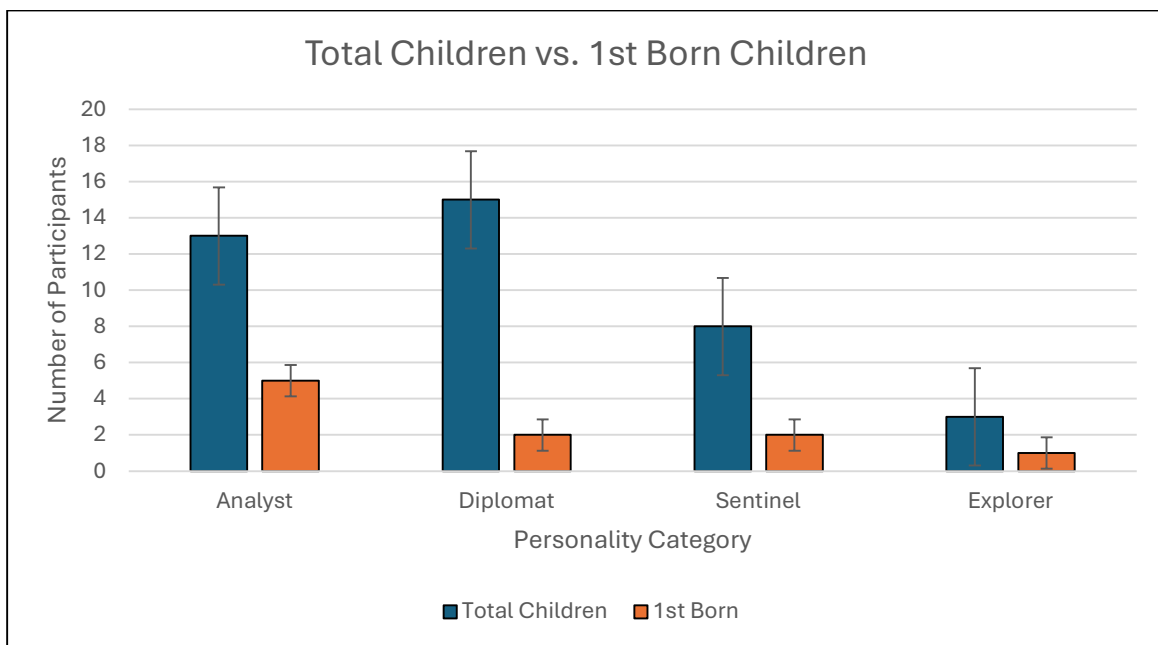


Figure 6: Distribution of total child participants compared to 1st born child participants based on the personality category.

There were also some visible preferences at the individual trait level. For first-borns, seven out of the 10 had the same preference for all five of the letters. These were Introvert, Intuitive, Thinking, Judging, and Turbulent. (I, N, T, J, and A, respectively).

For second-borns, five of the six preferred Introvert over Extravert (I vs. E for the first letter) as well as Feeling over Thinking (F vs. T for the third letter). There was not enough data to determine if there was a preference for the other three letters.

For third-borns, four of the five preferred Feeling over Thinking (F vs. T for the third letter) and all five preferred Judging over Prospecting (J vs. P for the fifth letter). There was not enough data to determine if there was a preference for the other three letters.

For fourth-borns, five of six preferred Intuitive over Observant (N vs. S for the second letter), and none of the other letters had a visible preference. Additionally, not enough data was collected for fifth-borns and only children to determine if there was a preference for certain letters.

For a 95% confidence interval in comparing family position to specific letters in the personality type, none of the family positions had a Chi-Squared value greater than the critical value (3.841), which fails to reject the null hypothesis that there is no significant preference for specific letters/traits based on family position. When comparing family position to the 16 different personality types, none of the family positions had a Chi-Squared value greater than the critical value (24.996), which fails to reject the null hypothesis that there is no significant preference for personality type based on family position.

To analyze the personality patterns within families, the number of letters differing for each relationship was recorded. For example, a family with a mother and three children would

have a total of six relationships: three for the mother compared to each of the children, and three for each of the children compared to each other. Mothers and fathers were not compared against each other. For the parent-to-child relationships, the third letter had the most differences in relationships across the families, with 18 of the total 26 relationships having the third letter differ between them. This was similar in the sibling-to-sibling relationships, in which the letter with the most differing, 13 of the 22 relationships, was the third letter. The first and fourth letter had the lowest number of differences for both parent-to-children relationships, and sibling-to-sibling relationships, with 19 of 48 total relationships and 18 of 48 total relationships differing, respectively. Although there is a correlation with certain letters having more differences, it could also be impacted by family size and structure of the participants, and may not be representative of different family sizes and structures.

Reflection Results

Most of the participants chose to answer the reflection questions at the end of the survey, which were meant to gauge their general interest in personality types after taking the personality test. When asked if they read about their personality type on the 16 Personalities website, 76% said yes and 15% said they would later. Only 9% said they did not read about it and didn't plan to. Of the participants that did or were planning to read about their personality type, 86% felt that it was fairly accurate or extremely accurate. 78% of those participants also said that they were somewhat likely or extremely likely to have a conversation with their family about their personality type. Finally, 56% of participants said they probably-yes or definitely-yes would use what they learned about their personality type moving forward.

Discussion

Limitations from the Survey Design

The survey design leaves room for error associated with lack of clear and concrete data regarding families. Since the family position was determined from a free response question, and participants could not be contacted for clarifications, some families were able to be better mapped than others. It appears instructions may not have been clear enough for some participants, so important data such as birth order position was not always provided. Additionally, families consisting of one child and the parent(s) could not be assumed to be single children, and therefore birth order position was unknown. All participants with an “Unknown” were only used in data analysis for general children vs parent pattern identification or whole family pattern identification, not sibling-sibling dynamics.

For sake of anonymity, very few identifiers could be collected. Since age was not collected, age gaps between siblings could not be studied. Age gaps have the potential to be impactful on sibling dynamics, as it determines how much time they really spent with each other during their childhoods. Siblings who didn't disclose whether they lived with their siblings for their whole adolescence or not were assumed to have spent most of it together. This assumption could also have introduced error.

Limitations from the MBTI and 16 Personalities

The Myers-Briggs Personality Type Indicator, though very commonly used, does have some reliability issues that most other personality tests suffer from. The MBTI assigns groups for people based on personality characteristics, which causes assumptions that these groups would express very little differences between the people in them, which is not the case. In his paper, Pittenger (2005) compiles evidence from several published sources that suggests that scores for each of the categories on the MBTI should be on a continuous scale, rather than one characteristic versus another characteristic, otherwise known as a unimodal scale. While 16 Personalities does show the users their scores on a continuous scale, many people still assume that they are either-or for each of the five letters. Additionally, many people view the personality types assigned by the MBTI as being “set at birth and tempered by experience” (Pittenger, 2005). However, the MBTI has low reliability scores for test retakes, which could either be from the fluidity of personality and how it is difficult to capture in just one personality test score, or poor test design.

This doesn't mean that personality tests shouldn't ever be used however. 16 Personalities is a Myers-Briggs *like* personality test, meaning that it is not the true MBTI, but rather a modified version that also includes some aspects of the Big Five Personality Traits. Additionally, 16 Personalities is a free test that anyone can complete online. While this website was chosen specifically for this reason, as there wasn't a budget to allow for the real MBTI training, it does mean that 16 Personalities isn't a verified test in the scientific community. They do not have peer reviewed or published papers to back up their reliability and validity, however, they do provide many articles on the website about the statistical analysis and reliability/validity scores that they have calculated.

Limitations in Personality Psychology

Due to the nature of personality, studies about personality tend to not be as reliable or accurate. Personality is a self-determined concept, whether conscious or not. If a person states in a personality test that they enjoy spending time out with friends, it is something that they have decided about themselves to be true. Whether or not it is true cannot be determined through just a test. Personality is just too intangible of a thing, causing it to be extremely difficult to study.

There are also many things that impact personality, such as the environment that people grew up in, which can make studying it difficult. A twin study on heritability of personality addressed the notion that 50% of variance in personality is due to genetics, and the other 50% is from the environment. They found however, that the percentage of variance due to genetics can differ between people, based on how they regarded their relationship with their parents. For example, people who regarded their relationship with their parents in a positive way tended to have genetics be greater than 50% impact, while those with a low regard for their parental relationship tended to have a less than 50% genetic impact (Krueger et al., 2008). The relationship between parents and children likely has a major impact on personality, which was unable to be measured in this study.

While studies of sibling dynamics widely support the birth order theory, there is still a lot of controversy surrounding sibling similarity, showing that studies on personality are potentially unreliable for solid conclusions. For example, Yu-Chin Her and her associates compiled data from many published sibling personality studies, and found that for some families, siblings that are more similar in terms of gender and age were often emotionally closer and had similar personalities due to their shared time, but other families exhibited less personality similarity

between siblings of similar age and same gender, as a way for them to differentiate themselves from each other (Her, 2021).

Additionally, there are things outside of parent and sibling relationships that can impact personality. While this study is focusing on sibling and parent dynamics with personality, participants personality type could very well have been impacted by other things in their life. In her article about personality psychology, Chung discusses how culture, race, and ethnicity should be considered when it comes to personality traits, as these are heavily weighed on by the social structure of a person's environment, and a large part of personality is how people interact with others around them (Arshad & Chung, 2022). This study design does not have the reach to grasp some of the finer details associated with differences in social class, but that is something that is likely impossible at this time, due to our general lack of knowledge about everything that can impact personality, as well as the weight of each of those influences.

Study Discussion

It should first be noted that there were not enough participants to provide significant scientific support for any patterns found, so it is recommended that future studies be performed with more data to validate any of the visual patterns discussed here. A study such as this would have a preferred sample size of around 384 participants for a confidence interval of 95% ($\pm 5\%$). Additionally, the Chi-Squared Test of Independence is less reliable when sample sizes are extremely small, so a definitive response to the hypotheses that family position and personality types/traits are correlated cannot be determined within this study.

There were some interesting results for personality type patterns between family members, however, and they should be treated as potential hypotheses for studies moving forward. To start, the preference for a specific personality type for both mothers and fathers is a good notion that there are a lot of external social impacts on personality other than family members. Perhaps becoming parents impacts personality type, as traits morph to better suit the role that society has deemed as “motherly” or “fatherly.” ISFJ, otherwise named the Defender, does make sense in that the traits it emphasizes are what society typically associates with motherhood. 16 Personalities describes Defenders as caring, supportive, and empathetic, with a tendency to not express their own emotions as assertively, all of which are important traits for the traditional housewife in American culture. Similarly, ENFJ, or the Protagonist, has many traits that people would associate with American father figures, such as being caring, charismatic, intense, and a natural leader for the family.

If personality category was to be looked at instead of personality type, these patterns still hold true. Almost all the mothers were in the Sentinel role, which is noted by 16 Personalities as being cooperative, practical, and stable. Almost all the fathers were in the Diplomat role, who are noted by 16 Personalities as being rational and natural role models. Perhaps Sulloway’s idea about niches to be filled can be applied to the mothers and fathers in this study, as they all had very similar traits to each other. Each family is its own microenvironment, and the niche of caregiver is typically filled by the mother, while the niche of provider is filled by the father. These are the most reasonable traits for each of them to have to successfully raise their offspring (Hertler, 2017).

It may be beneficial to our understanding of personality to perform a longitudinal study on personality type, in which participants take the same personality test at different times in their

life. That way, the impact of significant life changes, such as graduating, having children, or retiring, could be considered when looking at how personality type may change over a lifetime.

Mothers and fathers are not the only ones to hold roles in the family though. Patterns associated with Adler's birth order theory can be seen on a small scale within this study's results. According to Adler, first-born children tend to be intellectually mature, motivated, and responsible. They also tend to seek approval from authority figures (Adler, as cited by Cotteril, 2022). As the first-born, these children have full access to their parents' attention if they do what their parents request of them. Additionally, when other children are born, first-borns no longer hold the main spot of attention and will therefore do whatever it may take to stay in their parents' favor (Her, 2021). The data from this study does show a correlation for those similar traits in the first-born participants. The first-born children were more likely to be in the Analyst category, and according to 16 Personalities, Analysts rely on intelligence, rational, and fierce motivation. The preference for Introversion in the data could be associated with first-borns wanting to please the people around them, specifically their parents. Additionally, the preference for Intuition and Thinking could be related to their drive for intellectual maturity, potentially as a way to prove their worth to their parents. The preference for Judging could be related to the close eye that was focused on them during their early adolescence, as parents tend to be the strictest with the first born simply because they are typically more inexperienced with parenting in general.

Now as Sulloway describes, the next born child will not receive the same attention by being the same as their older sibling (Sulloway, as cited by Hertler, 2017). Second-borns therefore will often take a very opposite approach to gaining their parents behavior and be more outgoing and driven by emotions rather than rational. In this study, the second-borns did have a preference for Feeling rather than Thinking, which likely stems from differentiating themselves

from their older sibling who follows their brain rather than their heart. However, the data also showed that the second-borns preferred Introversion to Extraversion, which counters the typical outgoing nature for second-borns put forth by Adler's Birth Order Theory. This could be due to the small sample size of second-born children, and participants in general for the study.

However, it could also be related to how many siblings were born after the second. Yu-Chin Her (2021) mentions in her paper on similarities and differences between siblings that middle born children often act as peacemakers for the family. For some families, this might look different, and perhaps being the calm and collected one is what will pull a family together during unharmonious times. Data about how many total siblings there were was not always provided by participants, so their position as a middle child or the last born child couldn't be determined. This same issue exists for the third-borns and beyond. Future studies that have a focus on the birth order theory should include a better way to determine this from the participants to minimize the error associated with incorrectly categorizing children as middle children vs. the youngest children.

The third-borns in this study only had a small preference for Judging and Feeling and the fourth-borns only preferred Intuition. Once again, not being able to determine if these children were the middle or last born makes it hard to draw any conclusions about these preferences. Additionally, the sample size for all the birth order positions other than first-born was fairly small, so perhaps with a larger sample size for each, better patterns could be drawn.

Although the data collected from the study makes it difficult to observe any patterns in specific traits being different between family members, especially between siblings, the majority of participants who were siblings did have differences in their personality type when compared to each other. Therefore, this study's data aligns more with the sibling oppositeness theories

about personality, such as the competition for different niches in the family's microenvironment or hedge betting. There were so few sibling pairs that had the same or similar personalities that theories involving siblings growing to be like each other based on their shared time and experiences cannot be supported by this data. Once again, however, the issue of the age gap between siblings not being collected interferes with this study's ability to observe those patterns properly.

There are other options that could be beneficial for future studies when trying to solve some of the issues listed above. Probably the most accurate for the family mapping process would be in person interviews with the participants. This way, researchers can ask guiding questions to better figure out birth order position in families. The open-ended question used in this survey left too much room for error, with people not understanding the instructions or leaving out critical information they felt was unnecessary. The interview could also help with the issues associated with the lack of data on the age gaps between siblings or their living situations during adolescence. Many participants did not provide any information about whether they spent the majority of their adolescence with their parents and/or siblings, or about age gaps between them and their siblings. Both of these things could have a significant impact on how their personalities may have affected each other, being as they didn't have to compete for parental attention either because they didn't live together long enough, or the age gap was so large that their lives were very independent of each other. Another option could be to have a much more in-depth survey, with specific questions about birth order position, age gaps, and other finer details about the family. The survey used in this study was designed to be simple and fast to promote more people to complete it without compensation for their time. This however, combined with the need for anonymity, unfortunately caused the survey to not collect detailed enough data.

For the reasons listed above, the hypotheses drawn from the patterns in the data should not be thought of as solid conclusions, but rather as new starting points for future research. The patterns that can be seen will not apply to every person or every family, and it should be highly emphasized when people are learning about their personality that the personality types and traits discussed are not set in stone. Personality is too flexible to try to label with such singular words. These words should only be used as a guide when reflecting on personality, not a person's singular truth.

Self-Reflection Results

Although the personality data collected in this survey may not have led to any groundbreaking discoveries, it did completely fulfill its purpose to promote self-reflection for participants. One main goal for this study was to encourage people to dive into the finer points of what makes them who they are, so that they may better understand themselves, and therefore be able to better communicate that self to the world. The responses to the reflection questions within the survey were incredibly positive, with the majority of participants having not only taken the 16 Personalities test but also explored their results on the website. Additionally, 76% of participants agreed that they would be likely to have a conversation with their family about their personality type, which will potentially promote conversation about how they may communicate with each other better. Additionally, over half of the participants agreed that they would be likely to apply what they learned about their personality moving forward. This study should be considered a great success in the aspect that it got people thinking about the components that drive their personality, which they will hopefully use to better themselves and their communication with others.

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Appendix

Personality Similarities and Differences within Families

Start of Block: Consent Information

Q1 My name is Sadie Connor and I am an undergraduate student and researcher at Colorado State University in the biology department. I am conducting a research study on personality type patterns within families, using a Myers-Briggs Type Indicator-like test. The title of my project is Personality Similarities and Differences Within Families. I am the principal investigator, and you may contact me with any questions at Sadie.Connor@colostate.edu.

I would like you and at least one willing family member to take an anonymous online survey. Participation will take approximately 15 minutes for each participant, and there must be at least 2 participants. All participating family members must be of at least 18 years of age. Your participation in this research is voluntary. You may choose to stop filling out the survey at any time if you or any of your family members decide to withdraw their consent. However, since the survey is anonymous, once it is submitted, you will not be able to withdraw your survey from the data pool.

I will be collecting personality type, gender, and the position in the family (e.g. parent, child, birth order of siblings, etc.) for each participating family member, but no other identifying information. When I report and share the data to others, I will combine the data from all participants. There will be an option at the end of the survey for participants to be taken to a separate google form, where they may submit an email address for if they would like the results of the study shared with them once completed. This form's responses will be kept on a password protected computer that only I will have access to, and all emails will be deleted immediately after the results of the study have been shared to them.

While there are no direct benefits to you and your family, I hope that by taking part in the personality test and reading about your personality types, all participants will get a chance for self-reflection on their personality strengths and weaknesses. Additionally, the completion of this survey will contribute to the growing pool of information about personality types and how families' personalities may be connected.

While my portion of the survey has no identifiable risks to participants, the survey will direct you to another website containing the personality test. Participants must complete the personality test, after which they are given the option to start an account with the website, which is not required. The website does have lots of articles to read about participants' personality types and goes into depth

on strengths and weaknesses for each personality type, which may not be pleasant for all people to read about themselves. However, reading these articles is not required, only encouraged. It is not possible to identify all potential risks in research procedures, but I have taken reasonable safeguards to minimize any known and potential (but unknown) risks.

Any participant information collected as part of the research will not be used or distributed for future research studies.

To indicate you are 18 years of age or older, please click the option below to continue the survey.

I understand the above information and verify that I am of 18 years of age or older (1)

End of Block: Consent Information

Start of Block: General Instructions

Q2 Welcome to the survey! Below are some general instructions for how to complete the survey to best contribute to the research.

The first portion of the survey involves you taking a personality test on a separate website. At the bottom of this page is the personality test website name and link. Once you are on the website, you will click "Take the Test". This will begin the personality test, which should take around 10 minutes. The website will have an option to register with an email to make an account with the website, but you do not need to do this to receive your personality type. The website has their own Privacy and Confidentiality agreement that I encourage you to read. Once you finish the test, you will be given a 5-letter code that represents your personality type.

Each family member will be filling out their own survey, but in order to connect corresponding family members' surveys, you will be asked to design a code for the whole family. This code should be unique to your family so that your survey results will be linked to only each other's and no other survey taker's responses. Instructions for coming up with this code are on the following page of the survey. Only one member needs to decide on the code, but they must give it to all other participating family members to use.

The survey will first ask you for your family code, and then your personality type from the 16 Personalities website, and then your gender. Then you will be asked to briefly explain your relationship to the rest of the family members taking the survey with you. Finally, there will be some general reflection questions about your experience and personality type.

There must be at least 2 people from a family participating (meaning they have the same family code) for your survey to be included in the research. You may have as many people within your family participating as you would like, however.

Please only take the survey once per family you are participating with, but if you would like to take it again with a different family group, that is alright.

Let's get started! Below is the link to the personality test. Either copy and paste it or simply search "16 personalities test".

<https://www.16personalities.com/>

I have taken the personality test and am ready to continue! (1)

End of Block: General Instructions

Start of Block: Family Code

Q3 Family Code: This is how you will be designing a code that all of your family members will put in to link your surveys together. This will be a 4-character code. The first person to take the survey in the family should design the code. All other family members taking it should use this same code. Please follow the instructions below to make your family code. If someone already made your family code, you may scroll to the bottom of this section and put in your family code.

Character 1: The first character will be the first letter of the city in which your family spent most of your time together (ex: Washington- W)

Character 2: The second character will be the first letter of your family's favorite activity to do together (ex: Skiing- S)

Character 3: The third character will be the first letter of the name of your family's first family pet. If your family did not have a family pet, please put 0 for the third character. (ex. Doug-D)

Character 4: The fourth character will be the first letter of your family's go to meal to have together (ex. Mac & Cheese- M)

Example Family Code: WSDM

Once you have decided on a family code, please make sure to give this code to all other participating family members. NOTE: it is very important that all family members type the exact same code so that your surveys will be linked! Surveys without at least one matching code will be discarded from the research. Please double check it with your family before submitting!

Please type your family code below:

End of Block: Family Code

Start of Block: Personality Type

Q4 What is the 5-letter personality type you received from the 16 personalities website?
Please make sure to type it in the following format: INFJ-A

End of Block: Personality Type

Start of Block: Position in Family

Q5 What is your gender?

- Male (1)
- Female (2)
- Non-binary (3)
- Other (4) _____
- Prefer not to say (5)

Q6 Please explain your position in the family that you are participating with. This information will be used to map out relationships between personality types. Do not use names of any family members in your description.

Please include things like who you are participating with and how you are related to them. For participating "children," please also include how many siblings you have and what your birth order position is in regard to all of your siblings. If you have step siblings or adopted siblings, please

indicate what age you began living with them, if applicable. Feel free to include any other information that might help the researchers in mapping out your family.

Two examples are provided below:

"I am a child participating with my mother, stepfather, and 1 of my siblings. I have 1 older step sibling, and 2 younger full siblings. My stepfather moved in with my family when I was 7 years old, but his daughter (my older step sibling) was already moved out of the house at that time.

"I am participating with my wife and her two kids, which I am their step father. I began living with them when my wife's oldest child was about 4 years old. "

Now your turn!

End of Block: Position in Family

Start of Block: Reflection Questions

Q8 Did you read about your personality type on the 16 Personalities Website?

- Yes (1)
- No (2)
- No, but I plan to later (3)

Display This Question:

If Did you read about your personality type on the 16 Personalities Website? = Yes

Q9 How accurate do you feel the website was in capturing your personality?

- Not accurate at all (1)
- Not very accurate (2)
- Somewhat accurate (3)
- Fairly accurate (4)
- Extremely accurate (5)

Display This Question:

If Did you read about your personality type on the 16 Personalities Website? != No

Q10 How likely do you feel you are to have a conversation with your family about your personality type?

- Extremely unlikely (1)
- Somewhat unlikely (2)
- Neither likely nor unlikely (3)
- Somewhat likely (4)
- Extremely likely (5)

Display This Question:

If Did you read about your personality type on the 16 Personalities Website? != No

Q11 Do you think you will use anything you learned about your personality type in your everyday life?

- Definitely not (1)
- Probably not (2)
- Maybe (3)
- Probably yes (4)
- Definitely yes (5)

End of Block: Reflection Questions

Research Participants Needed!



https://colostate.az1.qualtrics.com/jfe/form/SV_6sZ_PRLqSSK0XkOi

Goals of the study

- Look at personality type patterns within families
- Encourage self-reflection on personality types

Requirements?

- Have a least one sibling, parent, or child who also wants to participate (but more are encouraged!)
- All members must be 18 years or older

This is an *anonymous* survey, each family member will take their own survey and only has to report their gender, personality type, position in the family (e.g. parent, child, birth order, etc.) and some general reflection questions. Step and adopted family members can also be included! Only takes about 15 minutes! Ask your family if they want to participate today!

Have questions? Email Sadie.connor@colostate.edu for more information

