

CONSULTING ENGINEERS: MYERS-BRIGGS TYPE AND TEMPERAMENT PREFERENCES

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INTRODUCTION

During the course of conducting workshops on interpersonal relationships, leadership, project management and team building for consulting engineering firms, the authors have administered the Meyers-Briggs Type Indicator (MBTI®)¹ Form M to 740 engineers from 13 consulting engineering firms. This paper presents the resulting information on Myers-Briggs Type preferences and on the related temperaments. The results are for engineers working within the specific environment found within consulting engineering firms and should not be considered as representative of other engineers in other work environments. Consulting engineering firms are for-profit companies that provide engineering services including planning, design and construction supervision to public and industrial clients. They provide these services under contracts that contain budget and schedule limitations. For the firms to be profitable, the engineers within the firm must be adept at planning and monitoring their projects. There is constant pressure to secure new projects, meet deadlines, produce high quality work and complete projects under budget. They often are working with more than one client and must understand the needs of each client, facilitate and get client buy-in to project decisions. The engineers ranged from entry level to those with 30 to 40 years of experience in consulting engineering. The firms in which they work ranged from 20 to 300 staff.

MYERS-BRIGGS TYPE PREFERENCES

The authors have described the MBTI® in detail in other publications (Culp and Smith 2001, Culp and Smith 2005a, Culp and Smith 2005b). The following summarizes the Myers-Briggs Type preferences.

The MBTI identifies behavioral preferences on four scales with two opposite preferences defining the extremities or poles of each scale:

- Where an individual prefers to focus their attention and get energy (Extraversion or Introversion)
- The way an individual prefers to take in information (Sensing or Intuition)
- The kind of criteria an individual prefers to use in making decisions (Thinking or Feeling)

¹ Myers-Briggs Type Indicator, Myers-Briggs and MBTI are trademarks or registered trademarks of the Myers-Briggs Type Indicator Trust in the United States and other countries.

- Whether the individual prefers to live in a more structured or a more spontaneous way (Judging or Perceiving)

The Extraversion-Introversion Preference - People with a preference for Extraversion (E) are energized by interacting with others. They prefer to bounce ideas off of others and talk things out. They are usually perceived as easily approachable and gregarious. Extraverts prefer to generate their ideas in groups rather than by themselves. They may become drained if they spend too much time in reflective thinking without being able to bounce their ideas off others. They like the opportunity to express their thoughts and may become frustrated if they aren't given a chance to voice them.

People with a preference for Introversion (I) usually work best and are energized when they have quiet time to think things through. Introverts prefer to think through things before saying them. They prefer to have a quiet workplace. They may be perceived as good listeners but also may be perceived as distant and hard to get to know. They usually find meetings or parties to be an energy drain and need some quiet time to recharge their energy. They process their thoughts internally. Because of their internal processing of ideas, the Introvert may reach a conclusion before discussing their thought process.

The Sensing-Intuition Preference - People with a preference for Sensing (S) prefer to take in the details of information that is real and tangible. They tend to be very observant about the specific details of what is going on around them and focus on practical realities. A Sensor prefers specific answers to specific questions. They like to concentrate on the task at hand and find most satisfaction in tasks that yield a tangible result. They are more comfortable working with facts and figures than theories. They prefer clear project task descriptions rather than getting an overall plan with the details to follow. Sensors like to hear about things in a logical sequence. They would rather be doing something than thinking about it. They typically are not interested in the big picture until they understand the details that lead to the big picture.

People with a preference for Intuition (N) like to take in information by looking at the big picture. They are typically not interested in the details until they understand how they fit into a bigger picture. They focus on the relationships between the detailed facts and look for patterns and new possibilities. Intuitives tend to think about several things at once. They find the future possibilities to be exciting and intriguing, more so than current information or working on an immediate task. Intuitives like to figure out how things work just for the pleasure of it. Intuitives tend to give general directions and may get irritated when a team member pushes them to be more specific.

The Thinking-Feeling Preference - People with a Thinking (T) preference look at the logical consequences of a decision. They objectively examine the pros and cons. They are energized by examining an issue to find what needs to be done so that they can resolve the issue. They like to find a standard or principle that applies to all similar situations. Thinkers tend to settle disputes based on what they believe is fair and truthful rather than on what will make people happy. Thinkers don't mind making difficult decisions and think it is more important to be right than liked. They are impressed with logical and scientific arguments.

Those with a Feeling (F) preference consider what is important to them and to others that are involved. They mentally place themselves into the situation so that they can identify with others and make a decision based on their values about honoring people. They are energized by supporting others. Feelers consider that a good decision is one that takes impacts on others into account. They prefer harmony over clarity and do not like conflict. They enjoy providing needed services to people. They will extend themselves to meet others' needs, even at the expense of their own comfort.

The Judging-Perceiving Preference - People who prefer Judging (J) like to live in a planned and orderly way. They want to make decisions, reach closure and move on. Judgers tend to be organized and structured. They like to have things settled. Schedules are very important to them. They have a place for everything and are not happy until everything is in its place. They don't like surprises. They have a schedule and plan for their project work and may get flustered if things do not go as planned. They keep thorough to-do lists. They start their project work early to avoid last-minute crunches that they find to be very stressful. Time commitments are absolute. It is difficult for a Judger to relax until the work is done.

People who prefer Perceiving (P) like to live in a flexible, spontaneous way. Detailed plans and schedules feel confining to a Perceiver. They prefer to stay open to information and last-minute options. They enjoy the process more than closure. A Perceiver likes to explore new ways of doing things. They often do not have a detailed plan for their project work but prefer to see what the project demands. Neatness is not as important as spontaneity and creativity. It is difficult for a Perceiver to start a task any sooner than they perceive is absolutely necessary – they are energized by the pressure of meeting a deadline. They have no problem relaxing first and doing the work later. Perceivers like to keep their options open and often avoid being pinned down. Time commitments are approximate, not absolute.

MYERS-BRIGGS PREFERENCE RESULTS

The MBTI results are summarized in Table One. Compared to a national representative sample (Myers et al, 1998), a slightly greater percentage of consulting engineers have a preference for Introversion (54.5% vs. 50.9%), a considerably greater percentage have a preference for Intuition (48.9% vs. 26.6%), a considerably greater percentage have a preference for Thinking (73.8% vs. 40.4%) and a considerably greater percentage have a preference for Judging (70.8% vs. 54.3%). If an engineer understands and recognizes these differences and adjusts his/her approach, communication and working relationships with the general public can be improved (Culp and Smith 2005b). For example, individuals tend to write reports or make presentations based on an approach that would appeal to them. A person with a Sensing preference is likely to make a presentation with a lot of details and perhaps only eventually links the details to a bigger picture. An Intuitive in the audience is likely to be so bored with the details that they will tune out of the presentation. By opening the presentation with the big picture and maintaining the balance between details and the big picture in the remainder of the presentation, the Sensor is much more likely to effectively reach an audience made up of Sensors and Intuitives.

Table One.
Myers-Briggs Preferences of Consulting Engineers versus the National U.S. Population

| Myers-Briggs Preference | Consulting Engineers | National U.S. Population |
|-------------------------|----------------------|--------------------------|
| Extraversion (E) | 45.5% | 49.1% |
| Introversion (I) | 54.5% | 50.9% |
| Sensing (S) | 51.1% | 73.4% |
| Intuition (N) | 48.9% | 26.6% |
| Thinking (T) | 73.8% | 40.4% |
| Feeling (F) | 26.2% | 59.6% |
| Judging (J) | 70.8% | 54.3% |
| Perceiving (P) | 29.2% | 45.7% |

The greater preference for Intuition among consulting engineers than in the general population may be contrary to a common public perception that engineers are Sensors focused on details needed to design and construct projects. However, the equal preference for Intuition is consistent with engineers looking for patterns in information and putting pieces of information together to come up with solutions for their clients' problems.

Type dynamics are more complex than just the characteristics associated with each of the four preference scales. There are 16 combinations of preferences, each leading to 16 different patterns of personality. The letters associated with each preference are used to summarize an individual's overall preferences. For example, an individual's preference for Extraversion, Intuition, Feeling and Perception would be summarized as ENFP. A discussion of the dynamic interaction between the four preferences is beyond the scope of this paper. Further discussion can be found in Myers et al 1987.

Table Two summarizes the 16 overall Myers-Briggs Types for consulting engineers. Information comparing the distribution of these types with the national U.S. population can be found in Table Three. The ratio of a given Type in a profession relative to the population as a whole indicates whether the field is more or less attractive to a given Type and is referred to as the self-selection ratio. A self-selection ratio greater than 1.0 indicates that there is a higher proportion of a given Type preference in a profession than in the population as a whole. Those with an ISTJ preference constituted the highest percentage (20.7%) of the sixteen Types with a self-selection ratio of 1.8 (see Table Three). However, the highest self selection ratios for consulting engineers are for ENTJ (ratio of 6.0) and INTJ (ratio of 5.7). These high ratios indicate a strong attraction to consulting engineering for those with Intuition, Thinking and Judging preferences.

Table Two. Type Distribution for Consulting Engineers

| | | | |
|---|---------------------------------|---------------------------------|---|
| ISTJ n=153 (20.7%) +++++ +++++ +++++ +++++ + | ISFJ n=33 (4.5%) +++++ | INFJ n=22 (3.0%) +++ | INTJ n=88 (11.9%) +++++ +++++ ++ |
| ISTP n=39 (5.3%) +++++ | ISFP n=8 (1.1%) + | INFP n=25 (3.4%) +++ | INTP n=35 (4.7%) +++++ |
| ESTP n=27 (3.6%) ++++ | ESFP n=11 (1.5%) + | ENFP n=27 (3.6%) ++++ | ENTP n=44 (5.9%) +++++ + |
| ESTJ n=80 (10.8%) +++++ +++++ + | ESFJ n=27 (3.6%) ++++ | ENFJ n=41 (5.5%) +++++ | ENTJ n=80 (10.8%) +++++ +++++ + |

Consulting engineers with an FP preference comprise only 9.6% of the sample with a self-selection ratio of 0.32 indicating that engineering is not typically an attractive field for individuals with Feeling and Perception preferences. Those in our sample with an SP preference have a self-selection ratio of 0.4 which is consistent with the earlier observation (Thomas et al, 2000) that SPs are the most likely to leave engineering during college. Another study (McCaulley et al, 1987) found that 96% of the engineering students who withdrew from engineering had preferences for Feeling or Extraversion or both. The self-selection ratio for an EF preference in our sample was 0.46. The high percentage of our sample in the four corners of the matrix shown in Table Two (TJ preference) also is consistent with the observation (Thomas et al, 2000) that engineering attracts students who are likely to have Thinking and Judging preferences. If students with certain Type preferences drop out of engineering based on the early years of engineering curricula, they obviously will not be a part of the talent pool of graduate engineers that can be drawn upon by consulting engineering firms. This is unfortunate because the full range of Type preferences are of value in the diverse mix of work and related interactions with clients and the public inherent in the consulting engineering field.

Table Three. Self-selection Ratios for Consulting Engineers

| Type | % of Consulting Engrs | % of National Sample | Self-selection Ratio |
|------|-----------------------|----------------------|----------------------|
| ISTJ | 20.7 | 11.8 | 1.8 |
| ISFJ | 4.5 | 13.8 | 0.3 |
| INFJ | 3.0 | 1.5 | 2.0 |
| INTJ | 11.9 | 2.1 | 5.7 |
| ISTP | 5.3 | 5.4 | 1.0 |
| ISFP | 1.1 | 8.8 | 0.1 |
| INFP | 3.4 | 4.4 | 0.8 |
| INTP | 4.7 | 3.3 | 1.4 |
| ESTP | 3.6 | 4.3 | 0.8 |
| ESFP | 1.5 | 8.3 | 0.2 |
| ENFP | 3.6 | 8.1 | 0.5 |
| ENTP | 5.9 | 3.2 | 1.9 |
| ESTJ | 10.8 | 8.7 | 1.2 |
| ESFJ | 3.5 | 12.3 | 0.3 |
| ENFJ | 5.5 | 2.6 | 2.2 |
| ENTJ | 10.8 | 1.8 | 6.0 |

Another practitioner (Calhoun, 2001) has noticed that there appears to be a higher percentage of female engineers with an Extraversion preference in consulting engineering firms than for male engineers although the practitioner lacked data to confirm his observation. We have made similar casual observations during the course of training sessions conducted for consulting engineering firms. We examined the data in our sample to see if the data supported such observations. Engineering has historically been a male-dominated field. Our sample was made up of 16% females and 84% males which reflects this historical trend. We found that 58% of the female engineers in our sample had an Extraversion preference while 42% of the male engineers had an Extraversion preference. Perhaps females with an Extraversion preference are more likely to pursue careers in this male dominated field.

TEMPERAMENT

Philosophers, writers and psychologists and others from many cultures and times from 450 B.C. to the present have observed four distinct natures or temperaments into which all people seem to fit. David Keirse, a California psychologist, found that four combinations of Myers-Briggs Type preferences corresponded to four basic temperaments (Keirse and Bates 1978). An excellent discussion of the temperaments, their characteristics and how to recognize them is available (Tieger and Barron-Tieger 1998). A summary of the temperaments, their relationships to Myers-Briggs Types and the core values of each temperament is presented below.

Traditionalists (SJ) – Traditionalists have a preference for Sensing and Judging (SJ). They value responsibility, reliability, duty and service. They appreciate structure and organization. They are typically hard workers who pride themselves on being dependable, reliable and thorough. They

respect authority more than the other temperaments. They believe in the importance of having and following rules and laws and support people and organizations that enforce them. They are careful, practical, realistic and put great emphasis on the value of common sense and what they have learned from experience. They are serious, responsible, straight forward and consistent. They communicate in direct, clear and efficient manner and prefer to talk about real things rather than hypothetical situations.

Experiencers (SP) – Experiencers have a preference for Sensing and Perceiving (SP). Their preference for Perceiving with its more spontaneous, go-with-the-flow style makes them different from other temperaments. Experiencers prefer to do rather than plan. They enjoy the present and rarely worry about the future. They tend to be pragmatic, short-term problem solvers. They are usually lighthearted, adaptable and flexible. They are not attracted to structure or hierarchy and are not easily impressed by authority. They often chafe at order or rules that keep them from following their impulses or curiosity. They usually smile a lot and rarely take things seriously for too long. Experiencers are always eager and ready to respond. They communicate with an easy and informal style.

Conceptualizers (NT) – Conceptualizers have a preference for Intuition and Thinking (NT). They tend to first focus on the big picture before being interested in the details and focus on the future rather than the present. They greatly value competence and have a drive to excel at whatever they do. They set very high standards for themselves and for others. They have a drive for knowledge. They are original thinkers and innovative problem solvers who are motivated by challenge. Conceptualizers are logical, analytical, objective and typically fair-minded. They are energized by dealing with complex problems and tend to be fiercely independent. They seek long-term solutions that advance them toward a vision of the future. When communicating, they tend to talk about the big picture and use diagrams, models, metaphors or analogies to make their points.

Idealists (NF) – Idealists have a preference for Intuition and Feeling (NF). They make decisions based primarily on their own values and how their actions will affect others. Idealists seek to understand as much about themselves and others as they can so that they can achieve their potential and are perpetually searching for meaning. They greatly value personal integrity, authenticity and being true to one's beliefs. They tend to be passionate and creative and are attracted to the unusual and different. It is important for them to feel connected to others. They think and talk long-term and globally, especially about issues that affect people. Their communication usually centers on personal concerns and relationships.

TEMPERAMENT RESULTS

A comparison of temperaments for consulting engineers versus the national population is shown in Table Four. There is very close agreement between the percentage of consulting engineers and the national population for Traditionalist and Idealist temperaments. There are substantially more Conceptualizers and fewer Experiencers in consulting engineering firms than in the national population. Seventy-three percent of the consulting engineers tested are Traditionalists or Conceptualizers as compared to 55 percent for the national population. When communicating with the public, consulting engineers need to be sensitive to the need to adjust their Traditionalizer/Conceptualizer approach to connect with Experiencers and Idealists. For

example, this may involve allowing the Experiencers the opportunity to pursue and discuss alternatives in an informal, setting that may seem uncomfortably unstructured to the Traditionalizer or Conceptualizer. A discussion of the impacts on others and how the issues being discussed may relate to global concerns beyond the immediate project situation may be needed to address the concerns of the Idealists.

Table Four. Temperaments of Consulting Engineers versus the National U.S. Population

| Temperament | Consulting Engineers | National U.S. Population |
|---------------------|----------------------|--------------------------|
| Traditionalist (SJ) | 39.6% | 40% |
| Experiencer (SP) | 11.5% | 30% |
| Conceptualizer (NT) | 33.4% | 15% |
| Idealist (NF) | 15.5% | 15% |

FURTHER RESEARCH

The Type preferences of engineers in organizations other than consulting engineering firms would provide some interesting insight into how different work environments attract engineers with differing Type and temperament preferences. Those within consulting engineering firms are faced with constant demands for project planning, budget compliance and meeting deadlines. The consequences of failing to do so may be more immediate and more severe than in some other work environments. Although we don't have the data to statistically prove a trend, we have observed that engineers with a preference for Feeling and Perceiving tend to leave consulting engineering more often and more quickly than Thinkers and Judgers to join research organizations, academia, public agencies or regulatory agencies.

Study of the implications of differing structures of college engineering curricula (especially during the first two years) on the retention of individuals with various Type preferences within engineering programs would also be of interest. The full range of Type preferences are of value in the diverse mix of work and related interactions with clients and the public inherent in the consulting engineering field. However, the first two years of engineering curricula do not appeal to individuals with Feeling and Extraversion preferences. A very high percentage of individuals with these preferences transfer to other fields. Engineering also does not attract many individuals with Feeling and Perceiving preferences. Adjusting the first year curricula so that individuals can see the value of their Feeling, Perceiving and Extraversion preferences in the world of consulting could lead to a more balanced mix of Types within consulting engineering firms.

REFERENCES

Calhoun, C., personal communication, 2001.

Culp, G. and Smith, A. (2005a). "Leadership Effectiveness and Behavior." *ASCE Leadership and Management in Engineering*, 39-47, April, 2005.

Culp, G. and Smith, A. (2005b). *The Lead Dog Has the Best View: Leading Your Project Team to Success*. ASCE Press.

Keirseey, D. and Bates, M. (1978). *Please Understand Me*. Prometheus Nemesis.

McCaulley, M.H., Macdaid, G.P. and Walsh, R. (1987), "Myers-Briggs Type Indicator and Retention in Engineering," *British Journal of Engineering Education*, 3, 99-109.

Myers, I.B., McCaulley, M. H., Quenk, N.L., and Hammer, A.L. (1998). *MBTI Manual: A Guide to the Development and Use of the Myers-Briggs Type Indicator*. Consulting Psychologists Press, Inc.

Thomas, A., Benne, M.R., Marr, M.J., Thomas, E.W., and Hume, R.M (2000), "The Evidence Remains Stable: The MBTI Predicts Attraction and Attrition in an Engineering Program," *Journal of Psychological Type*, 55, 35-42.

Tieger, P.D. and Barron-Tieger, B. (1998). *The Art of Speed Reading People*. Little, Brown and Company.