

Assessment of Keirse Personality Temperaments among Aerospace Electronics Students

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Introduction

Academic successes of students and college programs alike have depended in part on how well students are suited to their chosen major. DeMarie and Aloise-Young (2003) reported that interest in a particular curriculum or its related occupation has been the leading factor in such decisions. However, interest alone has not always resulted in the best career fit. Broad advertisement of popular majors has probably created greater student interest, and thus enrolments, compared to psychometric assessments of students. Nevertheless, Lewallen (1993) estimated 20% to 50% of freshman college students remain unclear about their academic and career goals. Probably nowhere has the poor fit between students and their college major been more discernable than in extremely technical curriculums, such as aerospace electronics (i.e., avionics).

Psychometric assessments, such as standardized tests that measure cognitive achievement and aptitude (e.g., IQ tests) and personality inventories that gauge a range of attitudes, interests, motivations, emotions, integrity, and interpersonal relationships, are utilized to match students to college majors (Hoffman, 2002). Temperament sorters fall in the latter category. They attempt to classify individuals according to trait similarities and dissimilarities. As an academic guidance tool, they offer students insights into their intellectual and vocational potentials to help them better define their educational goals.

Personality inventories have had a long and varied history of use. Thurstone (1938) conducted a 6-yr long study utilizing multiple psychometrics that showed the work people do matches their particular mental abilities. Universities have used his measures to predict college success (Goodman, 1944). Other researchers (Barrett, 1985; Campbell & Hansen, 1981; Gordon, 2000; Kuder, 1968) typed individuals using the Jungian four-letter personality dimensions that allowed them to predict academic and career choices. Personality tests and questionnaires have been used by the military in enlisting recruits, universities in enrolling students, and employers in screening potential employees. The *Journal of Psychological Type* has published more than 49 volumes devoted to the science of typology (Hoffman, 2002). The Keirse Temperament Sorter II® (KTS-II) has been used to investigate personality traits and job satisfaction in accounting (Wheeler, Jessup, & Martinez, 2002), learning preferences of construction management students (Stein & Gotts, 2001), job satisfaction among agriculture teachers (Watson, 1991), and indecisiveness and career indecision in undecided college students (Gaffner & Hazler, 2002).

Keirsey Model

The Keirsey model employs four dichotomous pairs of preferences as the basis of the four dominant temperament types (Advisor Team, 2004; Keirsey.com, 2008). They are sensing / intuiting (S / N), thinking / feeling (T / F), judging / perceiving (J / P), and extroversion / introversion (E / I).

Sensing (S) and intuiting (N) scrutinize the focus of a person's attention (Keirsey, 1998). Sensation refers to observing what is present in the world through one's five senses (i.e., externalization). Conversely, intuition refers to being aware of the inner imaginary world (i.e., introspection). "S" or "N" anchors each of the four character temperaments.

Thinking (T) and feeling (F) discriminate how a person governs himself or herself and how he or she behaves toward other people. Temperaments governed predominantly by intellect are typed "T" and those who instead follow the emotion of their heart are typed "F" (Montgomery, 2002).

Judging (J) and perceiving (P) probe how people make decisions and organize their lives. Judges tend to make quick decisions and desire order and schedules. Perceivers favor procrastination, being flexible, and having options.

Extroversion (E) and introversion (I) classify a person's social style or psychological source of energy (Keirsey, 1998; Montgomery, 2002). Individuals energized by being around others and who are inclined toward the outer world are typed "E." In contrast, those rejuvenated by being alone and who are more oriented toward their inner world are typed "I."

Each of the four character temperaments are anchored by two of the dichotomous traits. Table 1 lists these anchoring traits and brief descriptions.

Table 1
Keirsey Temperaments by Anchoring Traits

Temperament	Anchoring Traits		Description
Artisan (SP)	Sensing & Perceiving	(S) observant	(P) probing
Guardian (SJ)	Sensing & Judging	(S) observant	(J) scheduled
Rational (NT)	Intuiting & Thinking	(N) introspective	(T) tough-minded
Idealist (NF)	Intuiting & Feeling	(N) introspective	(F) friendly

Combinations of these traits are sorted into 16 skilled intelligent roles purportedly based upon observable behaviors that individuals do well (Keirsey, 1998; Keirsey & Bates, 1978). Table 2 provides the names and acronyms of the temperaments and their roles. For example, an extroverted thinking Artisan temperament is an "Artisan Promoter" (ESTP). Similarly, an introverted judging Rational is a "Rational Mastermind" (INTJ).

Table 2

Keirsey Temperament Names & Skilled Intelligent Roles

Name	Skilled Intelligent Roles			
Artisan	Promoter ESTP	Performer ESFP	Composer ISFP	Crafter ISTP
Idealist	Teacher ENFJ	Champion ENFP	Counselor INFJ	Healer INFP
Rational	Inventor ENTP	Fieldmarshal ENTJ	Architect INTP	Mastermind INTJ
Guardian	Supervisor ESTJ	Provider ESFJ	Inspector ISTJ	Protector ISFJ

Note. S: Sensing; T: Thinking; F: Feeling; P: Perceiving; N: Intuiting; J: Judging; I: Introvert; E: Extrovert.

Guardian Skilled Roles

The four Guardian skilled roles are the Supervisor (ESTJ), Inspector (ISTJ), Protector (ISFJ), and Provider (ESFJ). This temperament comprises about 40% to 45% of the population (Keirsey, 2004; Keirsey & Bates, 1978). Guardians tend toward concrete communications, are cooperative in implementing goals, and capable of becoming highly skilled in logistics, such as overseeing social functions. Their most developed intelligent operation is either supervising-inspecting (SJT administering) or supplying and protecting (SJF conserving). They usually study commerce in school and pursue hobbies having to do with regulations and employment involving material work (Keirsey, 1998).

Artisan Skilled Roles

The Artisan skilled roles are the Promoter (ESTP), Operator (ISTP), Performer (ESFP), and Composer (ISFP). This temperament comprises 35% to 40% of the population (Keirsey, 2004; Keirsey & Bates, 1978). They lean toward concrete communications, take a utilitarian approach toward implementing goals, and are usually highly skilled in tactical variation. Their most developed and proficient intelligent operation is promoting-operating (SPT expediting) or displaying-composing (SPF improvising) (Keirsey (1998).

Idealist Skilled Roles

The four Idealist skilled roles are the Teacher (ENFJ), Counselor (INFJ), Champion (ENFP), and Healer (INFP). This temperament makes up approximately 8% to 10% of the population (Keirsey, 2004; Keirsey & Bates, 1978). This temperament is abstract in communications, cooperative in carrying out goals, and can become highly capable in diplomatic integration. Their most practiced and developed intelligent operations are usually teaching-counseling (NFJ mentoring) or conferring-tutoring (NFP advocating) (Keirsey, 1998). They will become a sage in some form of social development if possible. They pursue the humanities in education, ethics as a hobby, and personnel work in as a career.

Rational Skilled Roles

The four Rational skilled roles are the Fieldmarshal (ENTJ), Mastermind (INTJ), Inventor (ENTP), and Architect (INTP). They make up about 5% to 7% of the population (Keirsey, 2004; Keirsey & Bates, 1978). This temperament is abstract in communications and utilitarian in implementing goals. They can be highly accomplished in strategic analysis. Their most developed intelligent operation tends to be marshalling-planning (NTJ organizing) or inventing-configuring (NTP engineering), of which they will master if able. They are the knowledge-seeking personality or the technology temperament. They trust reason, are theoretical, ingenious, logical, analytical, and curious (Montgomery, 2002).

Aerospace electronics (i.e., avionics) is a technically demanding field. Based upon the Keirsey personality theory, there should be a preponderance of Rational temperaments in this degree program because of their inherent educational interests in science, preoccupation with technology, and vocational preference for systems. Thus, the ENTJ Fieldmarshal, INTJ Mastermind, ENTP Inventor, and INTP Architect role variants should be prevalent. Despite the rather large body of research on psychometric assessments that ostensibly match students to their ideal college majors, literature correlating the personality temperaments of students within the field of aerospace electronics is virtually nonexistent. Nevertheless, review of the relevant literature indicates a potential for the Keirsey psychometric as a recruitment tool for this academic major.

Research Objectives

This study had two objectives. The first was to determine the frequency distribution of Keirsey personality types among aerospace electronics and avionics students attending Embry-Riddle Aeronautical University (ERAU). The second was to find out if the character temperaments of these students agreed with Keirsey's model prediction for type fit within this academic field.

Methodology

This theory-based research relied on the collection of qualitative data. The theoretical review sought to expand original constructs of the Keirsey theory (Keirsey & Bates, 1978). The report has followed an inductive organizational style.

Participants

All of the participants were students slated to graduate with an undergraduate degree in Aviation Maintenance Science with a core concentration in Aerospace Electronics from the ERAU Daytona Beach campus. Because these students were enrolled in capstone courses, they were considered academically successful. Stable career decidedness was also assumed because each participant was nearing completion of a four-year college degree.

Reluctance in divulging personal attitudes, beliefs, and one's personality type has been a known challenge to the accuracy of self-report instruments (Gaffner & Hazler, 2002). To encourage honest reporting and ensure anonymity to minimize inaccuracy bias, demographics on each individual

were not collected. However, the sample was comprised of 42 males and 2 females between the ages of 18 and 30 years old. It also represented a diverse ethnicity that encompassed Asian, Black, Hispanic, Indian, and White students across multiple nationalities.

Apparatus

The apparatus was the Montgomery Shorter Sorter® (Montgomery, 2002). The physical survey consisted of 38 forced-choice questions preceded by written instructions on how to complete the survey. The scoring template used to tally each instrument was on a separate form that was not part of the instrument administered to the participants.

The Montgomery Shorter Sorter® is an alternative form of the Keirsey Temperament Sorter II (KTS-II®). It measures the same variables and has essentially the same structure, difficulty level, instructions, scoring, and interpretation. However, it differs in the number of items. The Montgomery instrument has 38 items whereas the KTS-II® has 70. Thus, although the Montgomery instrument is a considered short-form version of the Keirsey instrument, equivalent-forms reliability does not necessarily exist.

Procedure

At the beginning of a normally scheduled class period in Aerospace Electronics, their instructor (the researcher) briefed the students about the study, fielded questions, and obtained voluntary informed consent before administering the instrument. All of the students completed a survey, so follow-ups were not necessary for unresponsives.

Participation was anonymous. Students were instructed to not write their name on the survey. There was no time limit to complete the questionnaire. Upon completion, each student put his or her survey in an unmarked envelope and then the researcher collected it.

The split-half test for homogeneity for the Montgomery Shorter Sorter® using a two-way random effect model revealed significant ($p > .001$) intraclass correlation ($r = .9492$) for a 95% confidence interval. The coefficients inferred highly correlated test halves and an instrument with high internal consistency.

Instrument validation relied on comparisons to both the KTS-II® and the Myers-Briggs Type Instrument (MBTI®). Reliability coefficients for internal consistency of the MBTI® Form-M were .91 to .92 across genders (Consulting Psychologists Press, 2002). Continuous test-retest correlations ranged from .90 to .94 for students and .89 to .97 for adults with a four-week interval between tests. Currently there are no published reliability statistics for the KTS-II®; however, the correlation for personality type matching with the MBTI® psychometric is approximately .75 (Keirsey, 2004). Over 40 million people from 140 countries in 18 different languages have taken the KTS-II® (Keirsey.com, 2008).

Results

More than half the participants responded as Guardians and nearly a third responded as Artisans (see Table 3). The judging (J) and perceiving (P) traits mirrored these proportions. The large number of Guardian and Artisan temperaments revealed an 80% predilection for the sensing (S) trait

over the intuiting (N) trait. The feeling (F) characteristic was twice as prevalent as the thinking (T) one, albeit both were a small minority.

Table 3
Distribution Results by Temperament

Temperament	Frequency	Percent
Guardian (SJ)	23	52.27
Artisan (SP)	12	27.27
Idealist (NF)	6	13.63
Rational (NT)	3	6.81

Note. All percentages are valid. $N = 44$.

Two skilled roles stood out: Guardian Supervisor ($n = 11$) and Guardian Inspector ($n = 8$). Together they constituted 43% of the sample (see Table 4). With the exception of Artisan Crafter ($n = 6$) and Artisan Performer ($n = 3$), the other skilled roles were represented by only one or two and there were not any Idealist Champions or Rational Masterminds.

Discussion

Frequency results diverge from published values for both the dominant temperament types and the skilled role variants. Compared to population estimates (Keirse, 1998), the sample contains from 7% to 12% more Guardians, 4% to 6% more Idealists, about the same percentage of Rationals, and 8% to 13% fewer Artisans (see Figure 1).

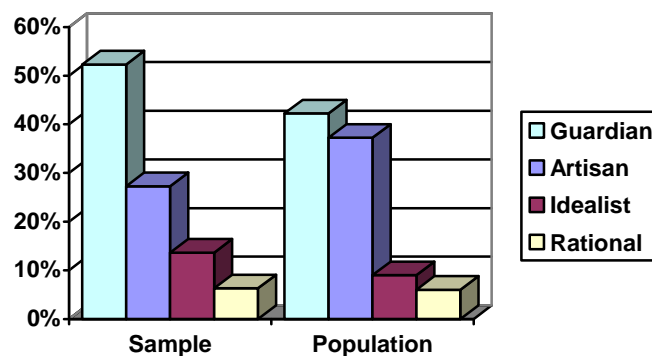


Figure 1. Temperaments of aerospace electronics students compared to the population.

The Keirse model predicts the Rational temperaments should predominate applied technical fields. Yet, there are only two Architects, one Field marshal, one Inventor, and no Masterminds among the aerospace electronics students.

The task of supervising focuses on enforcing rules and procedures. As such, the Guardian Supervisor seems like a better match for manager of an avionics repair station than an applied electronics. Yet, one in four of the students, the largest subpopulation in the sample, are Guardian Supervisors.

Troubleshooting avionics and electronic systems fits the preferences of the Guardian Inspector because it requires focus and attention to every detail. Despite this, less than one in five students are Guardian Inspectors.

Working with tools and test equipment is fundamental to careers in aerospace electronics. Indeed, Keirse (1998) mentions “supersonic jets...” (p. 66) as a tool Artisan Crafters would seek to master. Yet, fewer than one in seven of the students fit this type.

The sensation (S) preference outnumbers the intuition (N) preference among the students by four to one, but this may be due to learning style. These results parallel findings by Felder, Felder, and Dietz (2002) from their cohort study that correlated MBTI® type effects with scholastic achievements of chemical engineering students. Their results show intuitors typically perform better than sensors in introductory engineering courses whereas sensors outperform intuitors in capstone courses. This may be because, as Godleski (1984) has explained, intuiting students consistently outperform sensing students when the emphasis is on theoretical instruction instead of practical instruction, which is the case in most introductory courses. To wit, according to Rosati (as cited by Felder et al., 2002), sensors are far more likely to graduate in four years time. Yet, the proportions also may simply represent the general population because, as Marripodi (2004) claims, the ratio of sensors to intuitors in the national population is 75% to 25%, respectively.

In another longitudinal study, one involving 3,718 engineering students from different eight universities, the highest proportion of sensing types occurs in aerospace engineering (82%) and electrical engineering (80%) (McCaulley, 1990; McCaulley, Godleski, Yokomoto, Harrisberger, & Sloan, 1983). These percentages closely match this study's findings where 80% of the students also have the sensation preference. Other results show introverts to be more prevalent in aerospace engineering (61%) and electrical engineering (59%) compared to other engineering disciplines (McCaulley, 1990); however, only 52% of the students in this study are introverts.

Conclusions

The large number of Guardians in this study suggests there might be credence in advising potential students with this temperament, particularly those typed as Guardian Inspectors and Guardian Supervisors, to seek an education and livelihood in aerospace electronics. Furthermore, the low number of Rationals appears to indicate student recruitment in this major should not be based on temperament theory alone. While other evidence might point to the contrary, results from this study raise some doubts about the ability of personality inventories to reliability match students with the academic major of aerospace electronics.

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