# The use of MBTI in Software Engineering

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## Abstract

In this paper we evaluate the use of Carl Jung's theories of Psychological Type assessed using the Myer-Briggs Type Indicator in the Software Engineering field. The current level of implementation and its quality is established and the results discussed to provide insight into what we currently know, and suggestions on what could be important to investigate for the future.

Upon gathering MBTI data from a range of sources it is apparent that there is agreement on the types of personalities often discovered inside software engineering. *Thinking* and *judging* personality preferences are commonly found, while *feeling* and *perceiving* is far less common. This differs substantially from results representative of the American population, and supports the belief that software engineers are more commonly represented by specific *types* of people.

However, there is discrepancy between four of the 16 types identified in the MBTI, suggesting that there is still some understanding to be gained about personality in software engineering, and we do not by any means know the exact breakdown of types present within the industry.

## 1. INTRODUCTION

Software Development has been an expanding market for over 40 years, and it is estimated that the global software market grew by 6.5% in 2008 and is now valued at $303.8 billion [1]. It is also predicted that by 2013 the global software market will be valued at $457 billion [1].

Personality is a term used to describe the behaviour, traits and character of an individual, and can be used to suggest how different individuals process situations and events [5]. Each individual's different personality relates to how they prefer to use their mind, and this can explain apparently random behaviour and differences [3].

The Myers-Briggs Type Indicator has been used for over 50 years to identify the personality type of an individual and their personality preference, making the theories of Jung useful and applicable to everyday life.

In this paper we present the compiled results of 5 MBTI assessments on software engineering practitioners, and what this tells us about the personality of a software engineer. We then proceed to compare the compiled results with previously published results to draw conclusions and comparisons.

The purpose of this paper is to identify the current level of published data on MBTI assessments administered specifically to software engineers, their quality, validity, and what they tell us and suggest about the personalities of software engineering practitioners.

### 1.1 Background

The Myers-Briggs type indicator was developed by Katherine Briggs and her daughter Isabel Myers from the theories first published in 1921 by Carl Jung [6]. The MBTI (Myers-Briggs Type Indicator) was first published in 1962 [7], and has become a widely accessible and used tool in assessing a person's personality type.

The Myers-Briggs type indicator has become the most widely used personality inventory, with over 3.5 million assessments administered worldwide each year [7, 8].

| | | | |
|---|---|---|---|
| ISTJ | ISFJ | INFJ | INTJ |
| ISTP | ISFP | INFP | INTP |
| ESTP | ESFP | ENFP | ENTP |
| ESTJ | ESFJ | ENFJ | ENTJ |

*Table 1. Possible MBTI Types*

Carl Jung's theory on psychological type states that there are two *worlds* in which we can focus our minds (**Extraversion**, **Introversion**), when we are *using* our mind we are either taking in information (**Perceiving**) or processing this information and drawing conclusions from it (**Judging**).

Additionally we can *perceive* in two ways, by living in the present and focusing on what is real and actual (**Sensing**), or looking towards the future and the possibilities (**iNtuition**). And when we are *judging* this can also be done in two ways, by looking at the logical consequences and being analytical (**Thinking**), or by looking at what is important to ourselves and others and assessing the impact on people (**Feeling**).

These four pairs of scales produce the 16 possible Myers-Briggs types indicated in Table 1, and Figure 1 represents the four dichotomies and the two different preferences for each one.

According to the theory everyone has a preference to one of each of the paired scales [7], and this leads to your type category. For example a personality of INFP is someone with preferences to *Introversion*, *Intuition*, *Feeling* and *Perceiving*. Additionally, everybody has a favourite process which is used primarily in their favourite world.

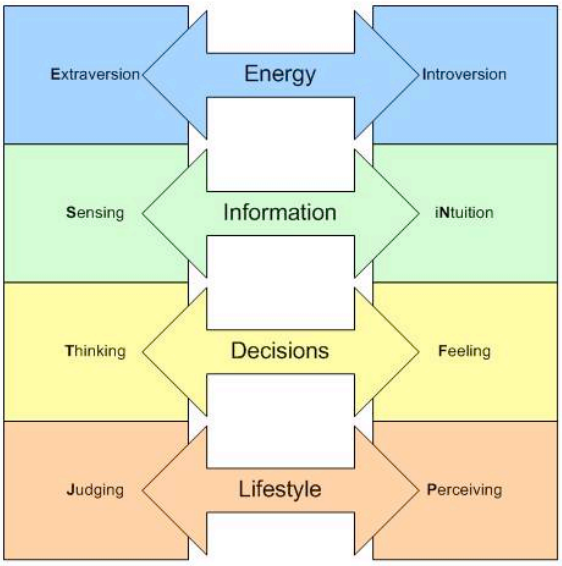



*Figure 1. MBTI Dichotomies*

Your favourite process is one of the two middle letters, and is most often used in your favourite *world*. To balance this, your second favourite process is used most often in the other *world*. For example, an INTJ would be described as favouring *introverted intuition* and *extroverted thinking*.

A lot of significance is put into your personality type as it suggests how you process and gather information, how you may act in situations, and your preferences in career choice [3]. It has been

reported that the personality of a software engineer and the entire team is an important factor relating to project success and team cohesion [4].

There has been some widely publicised criticism of the MBTI assessment, stating that:

> *There was no support for the view that the MBTI measures truly dichotomous preferences or qualitatively distinct types, instead, the instrument measures four relatively independent dimensions.*
> *(R. McCrae and P. Costa, 1989)*

This claim and other claims regarding the MBTI assessment, such as a lack of independent evidence, and no evidence that *MBTI measures truly dichotomous preferences or qualitatively distinct types*, among other criticisms, were published in 1989 [22].

Additionally, reported MBTI results in software engineering have not been without their problems. S. McDonald and H. M Edwards (2007) reported identifying an article which had claimed to be reporting MBTI assessment results was not actually using a MBTI assessment [10], as later admitted by the initial authors in the technical report [21].

### 1.2 Literature Review

The literature review consisted of searching through the major online databases of journals and papers (including IEEE, ACM, PsycINFO) specifically searching for *MBTI, Myers-Briggs personality,* and *software engineering*.

The results displayed a vast amount of papers discussing personality and its usage [10] and potential effect [9, 11, 12] on a range of aspects of software engineering, such as educating engineers [13], and practitioner preferences [14]. However there is a significant lack of published complete MBTI data specific to software engineers, as many of the published works only print their conclusions and what the data informs them of, and not the actual MBTI preference breakdowns.

Some of the papers focused on alternative approaches to identifying and describing personality, such as the Five Factor Model [19, 15], as well as some other papers focusing on specific practices or roles in software engineering such as pair programming [15, 16, 18], software testing [17], and software team cohesion [19].

The literature review identified 12 papers reporting tables of Myers-Briggs Type Indicator data. The following section discusses these papers.

### 1.3 Collected MBTI Data

Of the 12 identified published data collections, there were 10 useable collections. One collection of data was removed as it was not possible to access enough details about how the data was collected and when it was collected. Of the remaining 10 collections of data there is 5 that collect their data primarily from practitioners, and 5 that collect their data primarily from students.

It was decided to focus on the papers that specifically collected their data from active working practitioners and to exclude data collected from predominantly student samples. This was to ensure that the data was representative of working software practitioners, and not people who were only potential software engineers. The paper will now continue to discuss these 5 data samples.

The 5 pieces of data are predominantly published in a span of 5 years, with the first 4 all ranging from 1985 to 1990 and the 6$^{th}$ data being published in 2003. All of them were collected from western companies, primarily from America. We'll now look at the information provided by each source separately in chronological order.

The first source is an article published in a computing magazine (Datamation) in 1985 by M.L. Lyons. The data consisted of 1,229 computer professionals, of whom 213 of them were based in the UK and Australia; the other 1,016 were based in America. The data consisted of 73% males and 27% females, and the median age for males was 34 and for females it was 31.

The surveyed members had a median of seven years experience in computing, with 30% having worked in computing for 5 years or less. Twenty percent of the surveyed members were in management positions, with an additional 20% working as project managers and team leaders. No clear information is given about the gathering of the data.

The second source was an article published in the Journal of Psychological Type in 1988 by E. A. Buie. In this study the MBTI results of 47 scientific computer professionals were presented, with 57.6% of them being male. The MBTI method used to gather the data from this source is described as being from a questionnaire "developed specifically for this study".

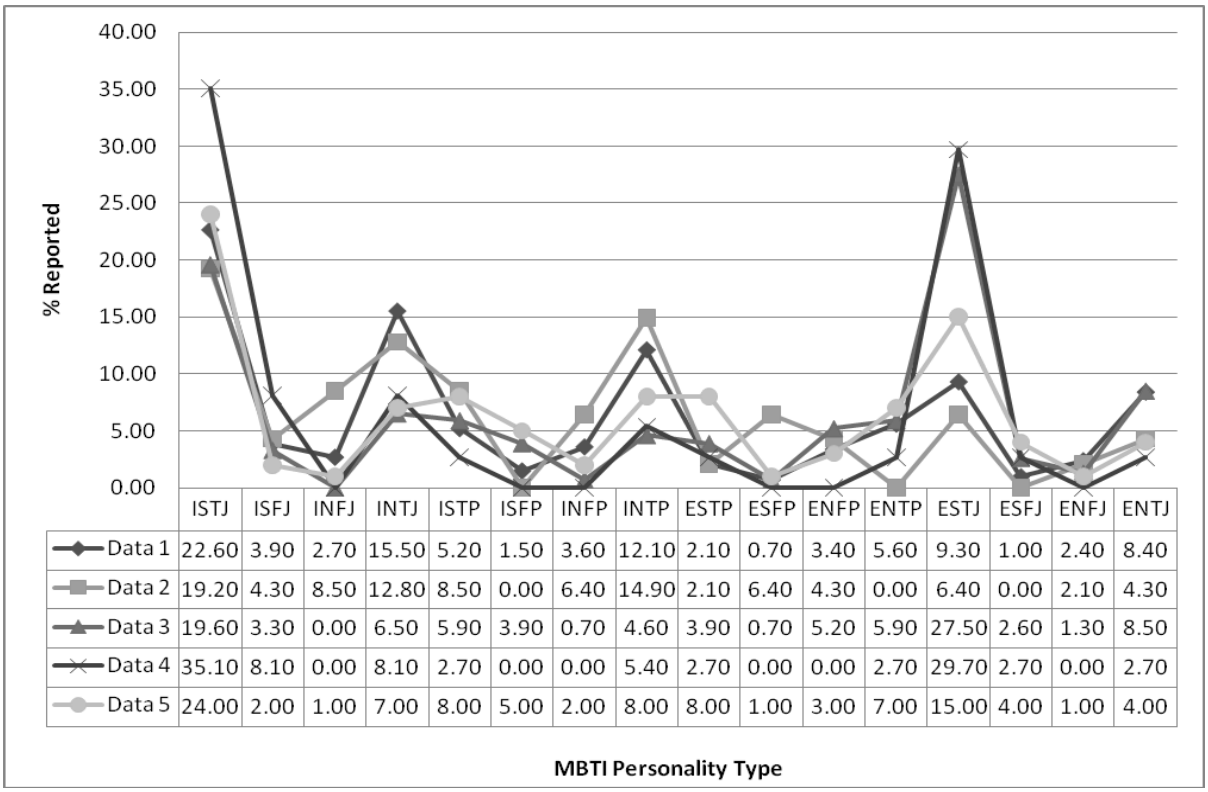
The third source was published in the Journal of Psychological Type in 1988 by P. Westbrook. The results presented were from a group of 153 professionals described as "Field Engineers". The results were said to be gathered from a "Fortune 400 computer company", and describes the method of gathering the information as a "self-scoring short form".

The fourth source is an article published in the ACM SIGCPR journal in 1989 by D. C. Smith. The data presented was gathered from 37 systems analysts working at a large insurance company. The method described for gathering the results is the "shorter version of the MBTI" and also states the questionnaire was administered by a psychologist.

The fifth source is an article published in the International Journal of Human-Computer Studies in 2003 by L. F. Capretz. This data collection contained 100 software engineers of which 80% were male and 20% female, and states that they were either working for the government, working for software companies, or were studying in public or private universities. The published paper also states that MBTI assessment was administered using Form G, which is an older and less reliable form of administering the MBTI assessment.

## 2. FINDINGS

This section discusses the 5 papers implementing a MBTI assessment on a group of software engineering practitioners. The data will be presented in this section, and discussed in subsequent sections.




| | ISTJ | ISFJ | INFJ | INTJ | ISTP | ISFP | INFP | INTP | ESTP | ESFP | ENFP | ENTP | ESTJ | ESFJ | ENFJ | ENTJ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Data 1 | 22.60 | 3.90 | 2.70 | 15.50 | 5.20 | 1.50 | 3.60 | 12.10 | 2.10 | 0.70 | 3.40 | 5.60 | 9.30 | 1.00 | 2.40 | 8.40 |
| Data 2 | 19.20 | 4.30 | 8.50 | 12.80 | 8.50 | 0.00 | 6.40 | 14.90 | 2.10 | 6.40 | 4.30 | 0.00 | 6.40 | 0.00 | 2.10 | 4.30 |
| Data 3 | 19.60 | 3.30 | 0.00 | 6.50 | 5.90 | 3.90 | 0.70 | 4.60 | 3.90 | 0.70 | 5.20 | 5.90 | 27.50 | 2.60 | 1.30 | 8.50 |
| Data 4 | 35.10 | 8.10 | 0.00 | 8.10 | 2.70 | 0.00 | 0.00 | 5.40 | 2.70 | 0.00 | 0.00 | 2.70 | 29.70 | 2.70 | 0.00 | 2.70 |
| Data 5 | 24.00 | 2.00 | 1.00 | 7.00 | 8.00 | 5.00 | 2.00 | 8.00 | 8.00 | 1.00 | 3.00 | 7.00 | 15.00 | 4.00 | 1.00 | 4.00 |

*Figure 2. Total MBTI Results*

## 2.1 Compiled Results

The purpose of these studies was to identify the MBTI preferences of the participants, and these combined results from the 5 collections of data are expressed as percentages of the 16 different types.

The results gathered from the 5 sources of MBTI data are displayed in figure 2. It is apparent that widespread conformity can be noted on the majority of types, with the most variation in reported levels being represented by ISTJ, INTJ, INTP, and ESTJ.

| | | | |
|---|---|---|---|
| ISTJ | ISFJ | INFJ | INTJ |
| 6.47 | 2.29 | 3.56 | 3.97 |
| ISTP | ISFP | INFP | INTP |
| 2.33 | 2.28 | 2.56 | 4.41 |
| ESTP | ESFP | ENFP | ENTP |
| 2.48 | 2.62 | 1.97 | 2.85 |
| ESTJ | ESFJ | ENFJ | ENTJ |
| 10.55 | 1.57 | 0.95 | 2.69 |

*Table 2. MBTI Standard Deviation*

Table 2 further supports the level of agreement in commonly reported results by presenting the standard deviation value for each of the 16 MBTI types when all of the different data collection results are combined.

Figure 3 compared the averages of all of the MBTI types based on the results gathered from the 5 sources to the average preferences of the US population as reported by CAPT (Centre for Applications of Psychological Type) [2].

The comparison makes it clear that the common preferences of the US population are not reflected inside software engineering. In different categories the preferences are over or under represented, but there is an emerging pattern that the *thinking* preference is consistently over-represented in the reported MBTI results.

ISTJ, INTJ, ISTP, INTP, ENTP, ESTJ, and ENTJ all display an average higher than the general US population, with the only exception being the marginal difference on ESTP from 4.30 to 3.76.

Table 3 shows the representation of each pair in the results, as well as the level of standard deviation and the mean. These figures were generated from the data represented in Figure 2. There is a higher level of variation when the data is constructed like this and thus the means are less reliable.

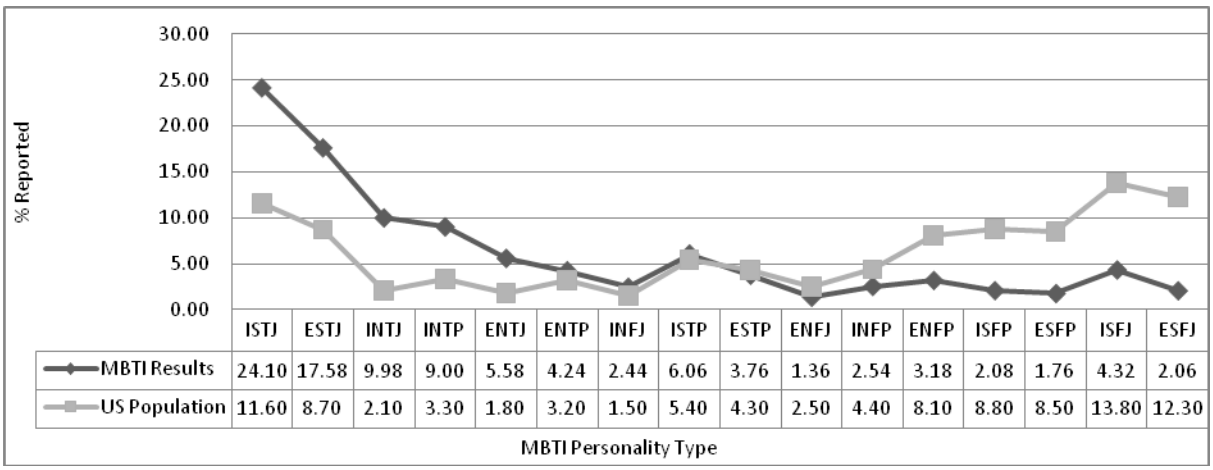



*Figure 3. MBTI Results and US Population Averages Comparison*

As you can see from Table 3, five of the highlighted pairings are pairings including thinking, and four of the pairings including judging. Sensing is also present four times, and extroversion and introversion appear three times each. However, feeling does not appear once, neither does perceiving, showing a clear lack of a common representation to either of these preferences.

| | Data 1 | Data 2 | Data 3 | Data 4 | Data 5 | Standard Deviation | Mean |
|---|---|---|---|---|---|---|---|
| **TJ** | 55.8 | 42.7 | 62.1 | 75.6 | 50 | 12.52 | 57.24 |
| **ST** | 39.2 | 36.2 | 56.9 | 70.2 | 55 | 13.93 | 51.5 |
| **IT** | 55.4 | 55.4 | 36.6 | 51.3 | 47 | 7.82 | 49.14 |
| **SJ** | 36.8 | 29.9 | 53 | 75.6 | 45 | 17.67 | 48.06 |
| **IJ** | 44.7 | 44.8 | 29.4 | 51.3 | 34 | 8.91 | 40.84 |
| **IS** | 33.2 | 32 | 32.7 | 45.9 | 39 | 5.92 | 36.56 |
| **ET** | 25.4 | 12.8 | 45.8 | 37.8 | 34 | 12.62 | 31.16 |
| **NT** | 41.6 | 32 | 25.5 | 18.9 | 26 | 8.53 | 28.8 |
| **EJ** | 21.1 | 12.8 | 39.9 | 35.1 | 24 | 10.92 | 26.58 |
| **ES** | 13.1 | 14.9 | 34.7 | 35.1 | 28 | 10.59 | 25.16 |
| **IN** | 33.9 | 42.6 | 11.8 | 13.5 | 18 | 13.59 | 23.96 |
| **TP** | 25 | 25.5 | 20.3 | 13.5 | 31 | 6.55 | 23.06 |
| **IP** | 22.4 | 29.8 | 15.1 | 8.1 | 23 | 8.31 | 19.68 |
| **NJ** | 29 | 27.7 | 16.3 | 10.8 | 13 | 8.45 | 19.36 |
| **NP** | 24.7 | 25.6 | 16.4 | 8.1 | 20 | 7.12 | 18.96 |
| **EN** | 19.8 | 10.7 | 20.9 | 5.4 | 15 | 6.45 | 14.36 |
| **SP** | 9.5 | 17 | 14.4 | 5.4 | 22 | 6.46 | 13.66 |
| **EP** | 11.8 | 12.8 | 15.7 | 5.4 | 19 | 5.06 | 12.94 |
| **IF** | 11.7 | 19.2 | 7.9 | 8.1 | 10 | 4.64 | 11.38 |
| **SF** | 7.1 | 10.7 | 10.5 | 10.8 | 12 | 1.84 | 10.22 |
| **FJ** | 10 | 14.9 | 7.2 | 10.8 | 8 | 3.01 | 10.18 |
| **FP** | 9.2 | 17.1 | 10.5 | 0 | 11 | 6.15 | 9.56 |
| **NF** | 12.1 | 21.3 | 7.2 | 0 | 7 | 7.87 | 9.52 |
| **EF** | 7.5 | 12.8 | 9.8 | 2.7 | 9 | 3.71 | 8.36 |

*Table 3. MBTI Paired Preferences*

The level of representation of *thinkers* is very apparent here with multiple pairings including *thinking* surpassing an average representation of 50%.

## 3. RESULTS SUMMARY

For the most part the MBTI results show agreement with each other. There are only two different types with a standard deviation above 5.00 (ESTJ with 6.47 and ISTJ with 10.55).

*Thinkers* are present significantly more within the results than *feelers.* This can be seen within the results where the types of *feelers* are commonly scoring lower than the types of *thinkers*.

## 4. DISCUSSION

### 4.1 Results Discussion

The results presented here, although from a range of sources and publications, present a common view on the MBTI personalities present inside software engineering. Although four of the five collections

of data were during 1985-1990, it is interesting that the one collection of data from 2003 does not show much if any of a change in the reported types.

The data suggests a relationship between psychological type and software engineers, but this does not imply that there is a singular fix for a software engineer nor that one type is more *useful* than any other, it simply suggests that there are some types more prominently found inside software engineering.

Specifically *thinkers* have been established by the data as being commonly represented as a preference by the majority of the reported results, with preferential *thinkers* representing an average (mean) of 80.3% of the reported results, compared to 19.7% being *feelers*.

There is also a 60/40 split in favour of *introverted* preference than the *extroverted* preference, which is different to the near 50/50 split suggested to be present among the US population. There is also a 67% representation of the *judgement* preference being present over the *perceiving* preference.

It is also worth noting that the pairing of *thinking* and *judging* is substantially higher than the US population (24.20%) with an average of 57.24%, while the pairing of *feeling* and *perceiving* is much lower than the US population (29.80%) with an average reported result of 9.56%.

All of this information leads to suggesting that *thinkers* and *judgers* are more attracted to software engineering and *feelers* and *perceivers* are less attracted to software engineering jobs, based on the data combined from 5 sources of MBTI assessment.

### 4.1 Limitations

The information presented here has inherent limitations on how the original collections of data have been published. There is not enough information published in most of the papers detailing how the assessments were administered, if a psychologist was present to administer the MBTI assessments, or what form was used. This makes it impossible to ensure the data is comparable across studies.

The details of the respondents also vary, with some of the papers stating the exact breakdown of age, gender and experience, with others offering either incomplete breakdowns or no information at all. The physical number of respondents also ranges from over a thousand to under fifty, as well as the type of people the results report about.

It would be acceptable to classify the 2$^{nd}$ through to the 5$^{th}$ source as valid as software engineering personnel, but the first source is simply too generic to be classified as specifically about software engineers. This means the type of data being compared cannot be described as being exclusively focused on identical groups of software engineers in a range of studies.

## 5. CONCLUSIONS

The results gathered here represent a common picture on the majority of the MBTI preferences present inside software engineering, and show a large preference towards *thinkers* and *judgers*.

On average there are 57.24% of the respondents with a *thinking judging* preference, 51.50% with a *sensing thinking* preference, and 49.14% showing an *introverted thinking* preference, further establishing the strong preference towards *thinking* in the results presented here.

The combined results of these 5 MBTI data collections compare well with other publications where full MBTI data was not available but the conclusions were presented. Bush and Schkade (1985) [23] also identified *thinkers* as being a significantly represented preference in their results of 40 programmer analysts with 73% of the respondents reported as being *thinkers*. They also identified that 70% of their respondents preferred *judging* as opposed to *perceiving*.

Thomsett (1990) [24] identified a high representation of *thinkers* (79%) in a group of 656 computer professionals. It was identified that there was a far higher representation of *judgers* than there was *perceivers*, with 92.3% of the respondents showing a preference towards *judging*.

However it is clear that there has been very little work done on the types of personalities in software engineering practitioners recently using the MBTI assessment tool, with only one of the results being published in the past 20 years (2003). This is important, as it's very likely at the types of roles, and software engineering has changed in those 20 years, along with the years since that study, with the growth of agile development practices.

If we are to accept and believe what we are told about the implications of personality and MBTI, it is extremely important that further work is done to understand the types inside software engineering. A better understanding could lead to a better workplace and task fit to specific people, specifically a greater understanding into the effects of personality on teams. It is not unreasonable to consider the possibility that the dynamics of a team and the personalities present could drastically affect performance and productivity.

The results presented here are old and generic, one collection of data is even too generic to really be considered about software engineers. Future work on personality, and specifically MBTI, should focus on establishing up-to-date classifications of what *software engineering* really means, and specifically the different roles identifiable inside this area. It's quite possible that the role of somebody considered a software engineer could also affect the type of personality drawn to this role, and potentially explain the variations reported in this paper. We do not yet have any data to suggest that the skills and personality required to be a software designer are equal to that of the skills required to be a software programmer, and Capretz (2010) [25] recently reports on the potential varying personality types required under the umbrella of software engineering.

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