The Influence of Personality on Computer Programming: A Summary of a Systematic Literature Review

Abstract

The objective of this report is to summarize the results of the systematic literature review we recently did on the influence of personality on computer programming (Karimi et al. 2014). In the SLR, we systematically searched online search resources and found 50 empirical and 4 theoretical studies with findings on the relations between personality characteristics and performance in computer programming. 28 empirical studies found an influence of personality on programming. We discussed that the other studies failed to find an influence of personality because of ceiling or bottom effects, small samples or incomprehensive personality test. We further analyzed the studies that found a relation and mapped the investigated personality characteristics of 22 empirical studies (out of 28) and 3 theoretical studies (out of 4) to the five personality factors: Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism. Due to inaccessible or invalid personality tests, we excluded several studies from this mapping. We found that either in theoretical or empirical studies all personality factors have an effect in at least one study. Except Conscientiousness which always has positive effects, other personality factors may have positive or negative effects. Moreover, all personality factors might have no effect in some cases. We concluded that there is an indication that personality affects programming but this relation is not clear and more studies are needed to clarify the influence of personality on programming.

Keywords: Personality, Computer Programming, Systematic Literature Review, Five Factor Model, Summary Report

1. Introduction

Programming is a human task and there have been studies about the influence of personality on programming for several decades. Recently we did a systematic literature review (Karimi et al. 2014) to integrate the wide area of reported knowledge to see whether or not personality affects computer programming and which personality characteristics are influential.

In the SLR, we followed Kitchenham and Charters's guidelines (2007) and systematically searched studies from 1970 to January 2013. We focused on studies which investigated individual personality characteristics and a direct measure of performance in programming. For example, we excluded studies that analysed aggregate personality measures in a team such as the average amount of Extraversion in a team (see Acuna et al. 2009) or studies that only presented results on the influence of homogeneous and heterogeneous personality in teams (see White 1984). As another example we excluded studies that investigated the links between personalities characteristics and job satisfaction (see Lounsbury et al. 2009). Although satisfaction relates to performance, it is not a direct measure of performance. We also excluded studies that only investigate the personality characteristics of exceptional programmers and not those of the non-exceptional ones (see Derro and Williams 2009). We included all studies on programming whether in a broad scope of software development or on a narrow scope of a specific activity such as code comprehension. But we excluded studies not related to software engineering, for example when they presented results on the influence of personality in engineering (see Martínez et al. 2013). We also excluded studies on narrow activities not related to source code such as the influence of personality on the comprehension of analysis diagrams (see Gorla et al. 2012).

We also included all studies both empirical and theoretical. Empirical studies use a sort of personality questionnaire to collect direct evidence on the effect of personality on performance in computer programming. Theoretical studies analyze a personality theory and a set of main skills to describe the most influential personality traits in programming. We found 54 primary studies: 50 empirical and 4 theoretical studies on the relations between personality characteristics and performance in computer programming.

We extracted the publication and contextual information from each study to answer two research questions about the trend and scope of studies. Then we extracted the relations between personality characteristics and performance and integrated the relations to answer two other research questions, about if personality affects performance and what the influence of personality characteristics is.

The objective of this report is to summarize the findings of the SLR. In appendix A, we summarize the included primary studies. For each study we show publication year, research scope, personality characteristics under investigation, and influential personality characteristics. For empirical studies we also show number and kind of participants, performance measure and whether or not personality affects programming. For theoretical studies we add their explanation of influential personality characteristics.

In the following we first present a short summary of personality in psychology in section 2. Then we summarize the integrated results of the primary studies. We show the trend of the research in section 3 and research topics in section 4. We answer the question of whether or not personality affects performance in section 5 and summarize the influence of personality characteristics in section 6. We conclude the report in section 7.

2. Personality in Psychology

Psychologists describe personality by a collection of personality characteristics named traits (Cloninger 2004). Although they are not sure how many and which traits should be considered in a comprehensive personality model, they have a good consensus about the comprehensiveness of the five broad traits in the Five-Factor Model (Digmann 1990). These five factors are: *Openness to Experience*, *Conscientiousness*, *Extraversion*, *Agreeableness* and *Emotional Stability*. Each individual has a numeric score on each factor, indicating how much of the factor the individual possesses. In the following we present a definition of each factor (extracted from a narrative report of the IPIP personality test: http://www.personal.psu.edu/faculty/j/5/j5j/IPIPNEOdescriptions.html).

Openness to Experience is a dimension of cognitive style that distinguishes imaginative, creative people from down-to-earth, conventional people. Individuals with a high score on *Openness to Experience* tend to think to complex, ambiguous and subtle concepts and in symbols and abstracts but individuals with a low score on *Openness to Experience* tend to think in plain and straightforward terms. Individuals with a high score on *Openness to Experience* enjoy novelty, variety and change whereas individuals with a low score prefer familiarity and are conservative and resistant to change.

The *Conscientiousness* score shows the degree of organization, persistence, control and motivation in goal-directed behavior. Individuals with a high score on *Conscientiousness* tend to set clear goals and pursue them with determination, individuals with a low score on *Conscientiousness* tend to act spontaneously and impulsively like to live for the moment and do what feels good now. Extremely *Conscientious* individuals might seem stuffy and boring while extremely impulsive (very low in *Conscientiousness*) individuals can be seen as colorful and fun to be with.

Individuals with a high score on *Extraversion* are sociable, energetic, lively and assertive. They often experience positive emotions, prefer to be around people much of the time and come to foreground. Individuals with a low score on *Extraversion* are introverted, reserved and quiet. They stay in the background and enjoy solitude and solitary activities.

Agreeableness shows the degree of selflessness concern for others and trusting and generous feeling. Individuals who get a high score on *Agreeableness* are considerate, friendly, generous, helpful and willing to share their interest with others. Their *Agreeableness* is not useful in situations that require tough and objective deci-

sions. Individuals who get a low score on the trait of *Agreeableness* are critical, aggressive, uncompromising and hardheaded. They are good scientists, lawyers and or soldiers.

Neuroticism (Opposite of *Emotional Stability*) is the tendency to experience negative feelings. Those who score high are more often anxious, depressed and angry and they might experience disturbance in thought and action. In contrast, individuals who score low are calm, emotionally stable and free from persistent negative feelings.

Not only is the Five-Factor Model a comprehensive and well accepted personality model but it is also a recommended framework for organizing and accumulating research findings (Digmann 1990). It captures dimensions that exist in other personality constructs. Therefore, we used the Five-Factor Model for integrating and synthesizing the primary studies in the SLR.

3. Research Trend

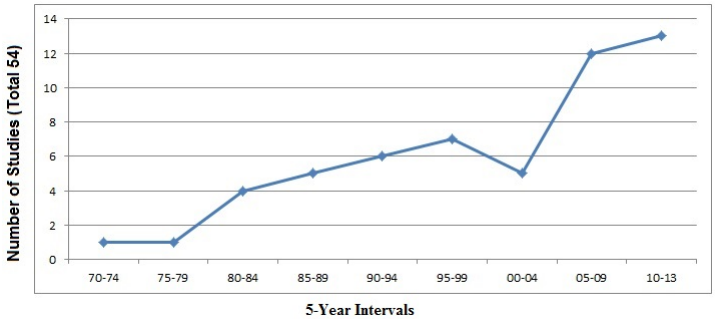


Figure 1. The trend of studies in personality and computer programming

Figure 1 shows the number of our included studies by five-year intervals. The first 29 studies were published over 35 years from 1970 to 2004 and the second 25 papers were published over eight years from 2005 to 2012. This means that before 2005, on average every 14 months one research study was reported but after 2005 a new research study was published every four months. The frequency of new publications has been nearly four times higher since 2005. Personality in programming has always been a subject of interest and it is still interesting.

4. Research Topics

In this section, we explain different topics in the included studies: scope of research (section 4.1), personality measures (section 4.2) and performance measure (section 4.3).

4.1. Research Scopes

We found five research scopes (see the research scopes of each study in the appendix and Figure 2 for a general picture). Research on programming activities investigates the influence of personality on specific programming activities such as code comprehension (see E11 for example). Research on software project investigates the influence of personality in the scope of a software project (see E24 for example). Research on software organization investigates programming as a profession (see E45 for example). Research on software roles investi-

gates programming in conjunction with other software roles such as analysis and testing (see T1 for example). Some studies have used two different scopes. For example, they investigated the influence of personality on software projects as part of a programming course (see E31 for example).

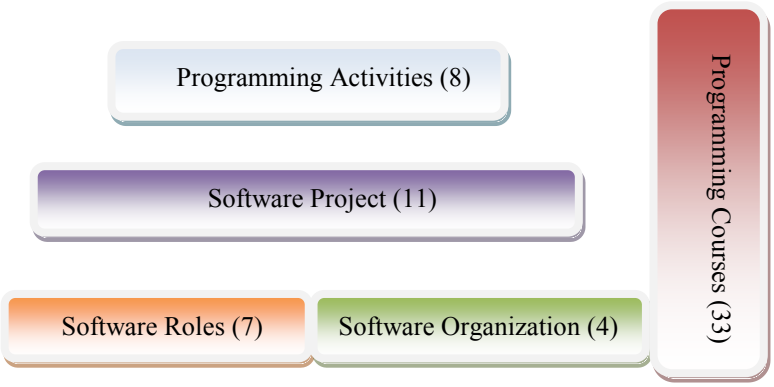


Figure 2. The scope of studies on personality and computer programming

4. 2. Personality Measures

Research used various personality measures (at least 18 kinds, see the personality measure of each study in the appendix). We classified personality measures in three categories: MBTI, FFM and Various. The majority of studies (21 and 40%) used MBTI, 12 studies (23%) used FFM and others used various tests. In Figure 3 we showed the trend of using different personality tests. Figure 3 indicates a high increase in using FFM and an irregular pattern of using various personality tests.

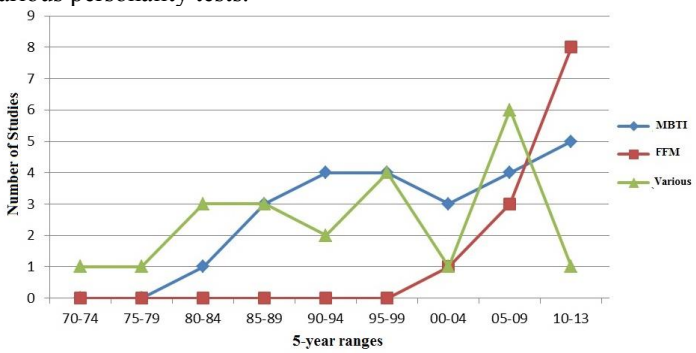


Figure 3. The trend of personality tests used in studies on personality and computer programming

4. 3. Performance Measures

We found 4 different performance measures (see the performance measure of each study in the appendix and Figure 4 for a general picture). The majority of studies (29 and 56%) used academic performance the grade students get in programming courses (see E42 for example). 9 studies (17%) interviewed or surveyed programmers or managers (see E45 and E35 for example). 8 studies (15%) investigated the quality of software such as the number of errors (see E47 for example). 6 studies (12%) used the score of programmers in a specific programming test (see E15 for example).

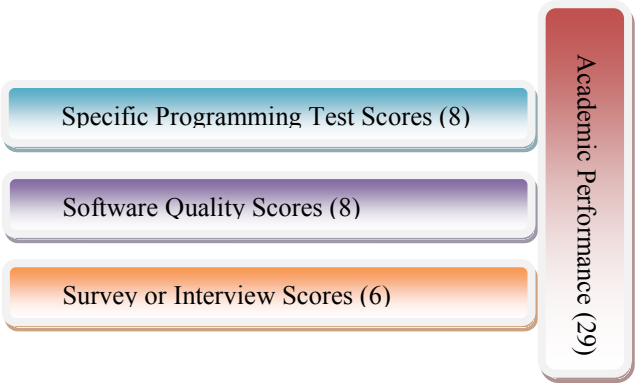


Figure 4. Performance measures on studies in personality and computer programming

4. 4. Summary

In summary we found that programming activities, programming courses, software projects, software organization and software roles are all acceptable settings to investigate the influence of personality. Programming course's grade, software quality score and survey score are all possible measures of performance in computer programming. The Five-Factor Model is increasingly used to assess personality in this area.

5. Does Personality Affect Performance?

To see whether or not personality affects programming, we extracted relations between personality and performance from empirical studies. We found 3 kinds of relation (see the results of each study in the appendix and Figure 5 for a general picture): Strong, Weak, Strong/No, Weak/No and No. One-third of studies (16 and 33%) found a strong relation between some personality characteristics and the performance measures in their sample (see E15 for example). One-fourth of studies (12 and 25%) found a weak relation (see E14 for example). One-fifth of studies (10 and 20%) found no relation between personality and performance (see E23 for example). Other studies (21 and 43%) did not find consistent relations, they found a relation (strong or weak) in some performance measures or they could not find any relations in some other performance measures (see E20 for example).

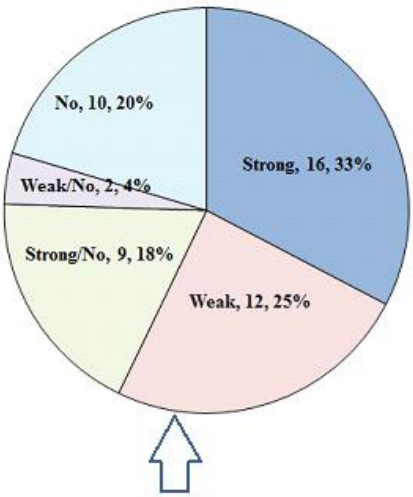


Figure 5. Relations between personality and performance in computer programming

Although the median relation confirms a weak relation between personality and performance in computer programming, we still do not know whether or not this relation really exists and in case there is a weak relation, whether or not this weak relation is worthy of investigation. To find it, we further analyzed this relation.

Table 1. Why did studies fail to find a relation?

Reason	#
1-Very difficult task or very easy task	12
2- Small sample and or no appropriate analysis method	6
3-No comprehensive or valid personality test	3

First, we analyzed the explanation of primary research which failed to find a (consistent) relation. We found 3 reasons (see table 1). In the majority of them (12 studies) the programming task was very difficult (for 9 studies) and sometimes (for 3 studies) very easy. Therefore, all their participants had very bad or very good performance and the influence of personality could not be found. In six studies, the sample was too small or they used inappropriate analysis methods and, therefore, they could not find the relations. In 3 studies the personality test is not comprehensive or valid. **Therefore, we concluded that in a normal situation with a comprehensive and valid personality test, this relation (statically) appears and, therefore, it does exist.**

Table 2. Other predictors in relation to personality

	Predictors
Better than personality	Experience, Attitude (Motivation) and Academic Performance (among students)
Worse than (or same as) personality	Age, Gender, Major, Intelligence

Definitely the relation between personality and performance is not strong (see Fig 4), therefore the question is whether or not this weak relation is worthy of investigation. We extracted the relation of other predictors with performance from the primary studies (see table 2). We found that the relation of personality is weaker than experience, attitude (motivation) and academic performance but stronger than age, gender, major and intelligence. Since personality is static and experience and attitude (motivation) are changeable, we concluded that personality is worthy of investigation even as a weak predictor. It might be that a software organization might select potentially good programmers and then train or motivate them. Therefore, personality as a static predictor might

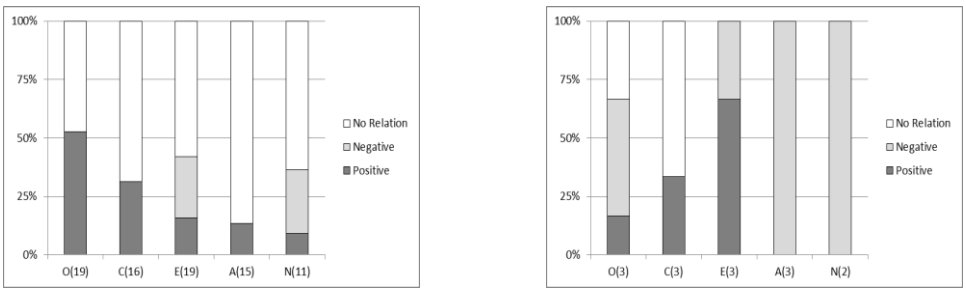
play a role. Another possible situation is when all candidates have the same level of experience or motivation and, therefore, personality as the next best predictor might play a role.

5.1 Summary

We found that personality has a weak relation by performance in computer programming and this weak relation is worthy of investigation. Since performance is measured with survey score or software quality, we also concluded that personality affects software quality and survey performance.

6. Influence of Personality Characteristics

The included empirical (theoretical) studies used various personality tests (theories). Therefore, we mapped all personality characteristics to Five Factors (see the last column in the appendix). We excluded all empirical studies that failed to find a relation (No in figure 4) or found a vague relation (Strong/No or Weak/No in figure 4). We also excluded all relations that we could not map to personality factors due to invalid (such as E35) or inaccessible personality tests (such as E05). Therefore, we integrated personality characteristics of 22 empirical studies and 3 theoretical studies.



(a) Empirical Studies (b) Theoretical Studies

Figure 6. The influence of personality factors in empirical and theoretical studies

We showed the nature of the relation between personality factors and performance in computer programming in all empirical studies (see Figure 6.a). We also showed the nature of this relation in all theoretical studies (see Figure 6.b). Figure 6 indicates that all personality factors had an effect in at least one theoretical study. Figure 6 indicates that there might be no relation between each of the personality factors and performance in computer programming. It also indicates that all personality factors had an effect in at least one empirical study or theoretical study.

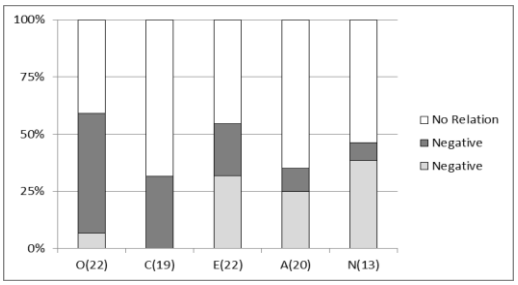


Figure 7. The influence of personality factors in included studies

We integrated the nature of the relation between personality factors and performance in computer programming in all studies (see Figure 7). Figure 7 also indicates that there might be no relation between each of the personality factors and performance in computer programming. It might be that other and better predictors override the influence of personality. Another explanation is that it might be that the relation between personality and performance is not linear. For example, both extraverts and introverts are good programmers or none of the low and high scores in agreeableness are not good programmers. Another possible explanation is that the influence of a personality factor might depend on other factors such as experience or another personality factor. For example, it might be that persons with low scores on agreeableness are good programmers only when they score high on openness (see E15 for example). As another example, people with high scores on openness are good programmers only when they are inexperienced (see E43 for example). Figure 7 also indicates that all personality factors had an effect in at least one study. *Conscientiousness* had only positive relations but other factors had positive as well as negative relations. It might be that the influence of a personality factor depends on the situation, for example team working or solitary work. We concluded that programming is complex and more empirical and theoretical studies are needed to clarify the influence of personality.

7. Conclusion

In this report, we summarized the main findings of the systematic literature review we recently did on the influence of personality on computer programming. We summarized the details of 50 empirical and 4 theoretical studies (see the appendix) and presented our main findings. The weak relation between personality and performance in computer programming is worthy of investigation. All personality factors might affect programming and the influence of each personality factor might depend on other factors such as experience and other personality factors or the relation between personality and performance might not be linear. We concluded that the influence of personality on programming is not clear and more studies are needed to clarify the influence of personality.

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Appendix A.1. Empirical Primary Studies

Ref	Year	Research scope	Participants	Personality	Performance	Affect?	Influential personality characteristics	Influential Factors
1	1982	Programming Courses	25 beginner students	Personal Profile	Academic	Yes/No	Personality affects final examination's score but not computer project's score	
2	2011	Software Project	26 students	MBTI	Soft Quality	No		
3	2009	Programming Activities (Debugging)	114 students & professionals	Locus of Control	Test Score	No		
4	1972	Programming Courses	50 beginner students	TTS	Academic	Yes	High: Impulsive, Sociable Med: Reflective, Dominant Low: No: Emotionally Stable, Active, Vigorous	- E-, O+ - N
5	2005	Programming Activities (Code Comprehension)	49 beginner students	Rajan's Inventory	Test Score	Yes	High: Med: Initiation Low: Persistence, Emotional Stability No: Self-Confidence, Cooperativeness, Sense-of-Responsibility, Sociability, Leadership, Attitude-of-self	
6	1987	Programming Courses	98 beginner students	Gittenger Theory	Academic	Somewhat/No	Personality affects composite score of the final examination, score of lab exercises, reading part of exam but not writing part of the exam	
7a	2010	Programming Courses Software Project/Team	128 students	FFM	Academic	Somewhat	High: Med: Low: O No: C, E, A	- - O+ C, E, N
7b	2010	Programming Courses Software Project/Team	128 students	FFM	Soft Quality	Somewhat	High: Med: Low: N No: C, E, A	- - N- E, O, A, C
8	1994	Programming Courses	93 beginner students	MBTI	Academic	Yes/No	Personality affects the score of assignments but not the score of final examination	
9	1997	Programming Courses	1157 beginner students	Holland's Theory	Academic	Yes	High: Med: Investigative Low: No: Realistic, Artistic, Social, Enterprising, Conventional	- O+ - E, A, C
10	1999	Programming Courses	86 beginner students	16PF 5	Academic	Yes	High: Extraversion Med: Low: No: Tough-poise	E- - - O

Appendix A.1. Empirical Primary Studies (Continued)

Ref	Year	Research scope	Participants	Personality	Performance	Affect?		Influential Factors
11	1992	Programming Activities Code Comprehension	117 beginner students	MBTI	Test Score	Yes/No	Personality affects the score of code comprehension for GOTO conditional structures but no other format of IF-THEN-ELSE	
12	1997	Programming Activities Code Comprehension	143 beginner students	MBTI	Test Score Dev Efficiency	Somewhat /No	Results are inaccessible	
13	2003	Software Organization	114 profes-sionals	FFM	Survey	Yes	High: C, E Med: Low: No: A, O	C+, E+ - - A, O
14	1986	Programming Courses	51 beginner students	MBTI Type A-B	Academic	Somewhat	High: Med: SN Low: No: EI, TF, JP	- O+ - E, A, C
15	2004	Programming Activities Code Review	64 students	MBTI	Test Score	Yes	High: SN Med: Low: No: TF , JP, EI	O+ A, E, C
16	2004	Programming Courses	45 beginner students and 44 students	MBTI	Academic	Somewhat	High: NT Med: Low: No: Non-NT	
17	2005	Software Project	29 students	FFM Locus of Control	Soft Quality	No		
18	1993	Software Project	50 students	MBTI	Soft Quality	Yes	High: EI Med: Low: No: SN, TF, JP	E- - - O, A, C
19	1993	Software Project/Team	41 students	MBTI	Soft Quali-ty/Team	No		
20	1989	Programming Courses	117 beginner students	MBTI	Academic	Yes/No	Personality affects the score of mid-terms and homework but not the score of final examination	

Appendix A.1. Empirical Primary Studies (Continued)

Ref	Year	Research scope	Participants	Personality	Performance	Affect?		Influential Factors
21	2004	Software Organization	118 professionals	Openness To Experience & Tolerance Of Ambiguity	Survey	Yes/No	Personality affects the Business Knowledge which is a scale of job performance but does not influence on other scales of job performance	
22	2011	Software Organization	50 professionals	FFM	Survey	Yes	High: Med: C, O, A Low: No: E, N	- C+, O+, A+ - E, N
23	2006	Programming Courses	42 beginner students	MBTI	Academic	No		
24	2004	Software Project/Team Software Process	<50 Professional	MBTI	Survey	Yes	High: EI Med: Low: No: SN, TF, JP	E+ - - C, O, A
25	2008	Programming Activities Code Comprehension	74 students	MBTI	Test Score	Yes	High: EI Med: Low: No: TF, JP, SN	E- - A, C, O
26	2006	Programming Courses	139 students	Neuroticism Locus of Control Generalized Self-Efficacy Self Esteem	Academic	Yes	High: Neuroticism, Self-esteem Med: Low: No: Self-efficacy, Locus-of-Control	- N- - -
27	1983	Programming Courses	79 beginner students	16 PF	Academic	Somewhat	High: Med: Liveliness Low: No: Warmth, Reasoning, Emotional- Stability, …	- - E-, A- O, A, N
28	1992	Programming Courses	20 students	Extraversion Neuroticism Stress	Academic Dev Efficiency	Yes	High: Med: Stress, Neuroticism Low: No: Introversion, Neuroticism	- N+ - E
29	1985	Programming Courses	228-302 beginner students	Introversion Neuroticism Social Desirability Scale Self-Monitoring Hostility Inventory Type A-B	Academic	Yes/No	Personality affects the score of three exams but not the score of one exam	
30	2009	Programming Courses	102+ 101+ 88+ 38+ 12 beginner students	MBTI	Academic	No		

Appendix A.1. Empirical Primary Studies (Continued)

Ref	Year	Research scope	Participants	Personality	Performance	Affect?		Influential Factors
31	2011	Programming Courses Software Project/Team Software Process	56 students	FFM MBTI	Survey	-	They simply observed the team success or fail. They did not use any analysis methods	
32	2012	Programming Courses Software Project/Team Software Process	72 students	FFM MBTI	Survey	-	They simply observed the team success or fail. They did not use any analysis methods	
33	2009	Programming Courses	421 beginner students	Holland Color Test	Academic	No		
34	2010	Programming Courses	421 beginner students	Holland Color Test	Academic	Somewhat	High: Med: Investigative, Social Type (O+, E+, A+) Low: No: Realistic, Artist, Enterprise, Conventional (C, O, E)	- -A+ C
35a	1975	Programming Courses	131 beginner students	Extraversion and Aggressive	Academic	Somewhat	High: Med: Extraversion Low: Aggressive No	
35b	1975	Programming Courses	131 beginner students	Extraversion and Aggressive	Survey	No		
36	1984	Programming Courses	160+60+66 beginner student	Locus of Control	Academic	No		
37	2010	Programming Courses Software Project/Team	80 students	MBTI	Soft Quality/ Team	Somewhat	The influence of personality characteristics is not clear	
38	2011	Programming Courses Software Project/Team	80 students	MBTI	Soft Quality/ Team	Somewhat	High: Med: Low: EI, SN, TF No: JP	
39	2009	Programming Courses	49 beginner students	FFM	Academic	Yes	High: Med: O, C Low: No: E, A, N	- O+, C+ - A, N
40	2010	Programming Courses	218 beginner students	FFM	Academic	Yes	High: O Med: Low: No: C, E, A, N	O+ - - C, E, A, N
41	2010	Programming Courses	118 beginner students	FFM	Academic	Yes/No	Personality affects the score of tutorial, assignments and midterm but not the score of final examination	
42	2011	Programming Courses	137 beginner students	FFM	Academic	Yes	High: C Med: O Low: No: E, A, N	C+ O+ - E, A, N

Appendix A.1. Empirical Primary Studies (Continued)

Ref	Year	Research scope	Participants	Personality	Performance	Affect?		Influential Factors
43	2012	Programming Courses	77 beginner students	FFM	Academic	Yes/No	Personality influences the score of midterm and final examination but not the score of assignments	
44	2007	Software Project/Team Software Process	183 profes-sionals	FFM	Survey	-	They have not done any validation on the in-fluence of personality on performance	
45	1995	Software Organization	20 profes-sionals	MBTI	Survey	No		
46	1986	Programming Courses	58 beginner students	MBTI	Academic	Somewhat	High: Med: SN Low: No: EI, TF, JP	- O+ - E, A, C
47	1998	Programming Activities Modification	13 profes-sionals	PREVUE	Soft Quality Dev Efficiency	Yes/No	Personality affects the performance on a novel modification task but not on the regu-lar task and not on the total performance	
48	1984	Programming Courses	98 beginner students	MBTI	Academic	Somewhat	High: Med: JP Low: No: EI, SN, TF	- C+ - E, O, A
49	1991	Programming Courses	98 beginner students	Locus of Control	Academic	Yes	High: Locus of Control Med: Low: No:	N- - - -
50	2005	Programming Courses	236 beginner students	MBTI (2-letters)	Academic	Yes	High: SF s are worse than other groups Med: Low: No:	

Appendix A.2. Theoretical Primary Studies

	Year	Research scope	Personality	Influential Characteristics	Explanation		
1	2006	Software Process	16PF and 16PF-5	Sensitivity+	Likelihood to get up-to-date information on system, software and knowledge engineering environment	O+	O+ O- C+ E+ A-
				abstractedness-	Likelihood to have analysis capability because they are abstractedness and solution oriented (not idea oriented)	O-	
				Rule-Consciousness+	Likelihood to have discipline	C+	
				Perfectionism+	Likelihood to have self-organization Likelihood to have tenacity: stick to the viewpoint or plan of actions until pursued objective achieved or until it is no longer reasonable to insist, keep up the same behavior as far as possible	C+	
				Warmth+	Likelihood to have empathy and, therefore, be aware of and be able to satisfy the present or future needs or demands of potential users	E+ O+	
				Self-reliance -	Likelihood to have team-work capability	E+	
				Dominance+	Likelihood to be independent	A-	
				Reasoning+	Likelihood to have analysis and decision-making capability		
				Emotional Stability+	Likelihood to have tenacity, stick to the viewpoint or plan of actions until pursued objective is achieved or until it is no longer reasonable to insist keep up the same behavior as far as possible	N-	
				Tension-	They have more stress tolerance	N-	
				Anxiety-	They have more stress tolerance	N-	
				Tough-mindedness-	Likelihood to have analysis capability	O-	
				Independence+	Likelihood to have more independence	A-	
2	1995	Programming Activities	MBTI Locus of Control	EI	Likely to attempt to understand a situation with discussing the problem with clients or peers rather than with books and internal thought	E+	E+ A- N- O
				TF	They are better at interpreting variables because they are rational	A-	
				Locus of Control(-)	They are more probable to have a sense that the program is not working because of a faulty machine rather than own actions. They work better in situation that needs persistence	N-	
3	2010	Software Process	MBTI	SN	They pay thorough and acute attention to details	O-	O- E- A- N
				EI	Ability to concentrate and work alone for many hours	E-	
				TF	Strong analytical problem-solving skills	A-	
4	1998	Software Process	MBTI	ISTJ, SP, NT			