



Article Type: Research Article

Received: 21/09/2020

Published: 09/10/2020

DOI: 10.46718/JBGSR.2020.05.000112

The Study of Diverse Personalities that Hinder Harmony across Engineering Team

Khatib SA¹, Naveed N¹ and Anwar N²¹Faculty of Technology, School of Engineering, University of Sunderland, Sunderland, UK²Department of Computer and Information Sciences, Northumbria University, UK

*Corresponding author: Naveed Niva, Faculty of Technology, School of Engineering, University of Sunderland, Sunderland, SR1 3SD, UK

Abstract

Working together harmoniously in an engineering team is crucial to achieve success and is essential to the team members' wellbeing. This study examines what types of personalities hinder the harmony across engineering teams and the outcome of this study is crucial to recognise how to maintain harmony across engineering teams with diverse personalities. Consequently, the data is collected from experienced engineering team leaders as well as an experienced psychologist. This study shows that in the engineering industry personalities are looked at from a different perspective and their characteristics are perceived from a business point-of-view as opposed to the literature in which judgments are made upon the personality description.

Keywords: Team Harmony, Engineering Teams, Diverse personalities, The big five model

Introduction

A crucial part of managing engineers is getting them to be as positive as possible while working as a part of a team. Working in teams is common in engineering environments, whether it is a maintenance team, academic team, or a manufacturing team [1]. Within any engineering team it is important to have lots of different contributions and to have different styles so that any problem or issue can be addressed from various angles, however many contributions sometimes can create friction, particularly when the dark side of some personalities with strong and extreme characteristics emerges which often lead to situations where people reach an impasse that they are no longer being effective or productive [2]. Accordingly, this study examines the impact of having diverse personalities within an engineering team by using the Big Five Model which is comprised of five personality traits that are seen as the core of personality; (1) Openness to experience, (2) Conscientiousness, (3) Extraversion, (4) Agreeableness, and (5) Neuroticism [3].

The significance of investigating personality impact on engineering teams is that they are commonly overlooked as engineering organisations in general mainly focus on engineers' technical skills and education, not their

interpersonal skills. As noted by Yeager and Nafukho [4], technical skills are necessary and of significant importance to engineering but not sufficient enough to ensure team harmony over time. In essence, personality is a critical factor that can sway the team in either a harmonious or frustrating direction [4].

In an ideal organisation, engineering teams would work in an environment that promotes collaboration, positivity and acceptance in which perfect harmony is the norm. But in reality, this is often different as teams regularly witness disagreements and disputes [5]. Although these incidents often fade quickly and are forgotten with time, the harmony across teams will be weakened and negatively affected over the long term [1,4,5]. Accordingly, harmony can best be seen as the willingness to listen, respect and understand others in their differences [6]. In other words, this view indicates that harmony can be achieved by having a mutual agreement and trust between team members regarding ideas, viewpoints, and any other aspect that requires collaborative efforts. As noted by Ergüna and Balçın engineers are problem solvers; they provide alternatives, technical insights, and build complex systems [7]. Hence, engineering teams often find themselves flooded with different ideas, perspectives and viewpoints due to each team member personality type

[6], which is essential in engineering as brainstorming with diverse personalities leads to creating a wide range of innovative solutions and ideas.

With regards to diversity, a recent study by Weeks et al. found that diversity has a positive effect on teams, thus organisations can benefit greatly from such variety as it brings different skills and ideas to the table [8]. On the other hand, according to Clark and Polesello non-diverse teams are likely to apply a more uniform approach to discussions and problem solving which ultimately dampens innovation and limit the solutions [9]. There are various prominent types of diversity in the workplace; such as race, age, gender, culture and personalities which is a major area of interest within the field of diversity [10]. Accordingly, personality diversity has long been recognised as a potential problem in the workplace that deserves serious attention [11]. Moreover, a strong relationship between personalities and team harmony has been reported in the literature [12]. In general, there are many different ways to think about and conceptualize personality and that is evident in various models for personality types [4].

A considerable amount of literature has been published on personality traits. These studies have long attempted to define exactly how many personality types exist. One of the most well researched and respected personality models in the field of psychology is The Big Five personality model. According to Myszkowski et al., this model is considered as the most comprehensive, general and robust personality model, and most importantly it is well recognized as an organisational framework for understanding personality traits in the workplace [13]. Likewise, Arora and Rangnekar hold the view that this model is well recognised for its stability and validity across various industries and cultures [14]. This model evaluates personalities on five different axes; Openness to experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism [3].

Personality types that Hinder the Harmony across Engineering Teams

As mentioned before personality diversity has a pivotal role in providing the richness necessary for team success. But, if it is not carefully managed it will create conflicts, clashes, and tensions that hinder the harmony across engineering teams [9]. Engineering teams are made of individuals in which each one is different from another. An example of this is the study carried out by Yilmaz et al. in which five teams of software engineers with 12-20 members each were studied, and it was found that the most productive team of the organisation was the team with the most extroverted members as a consequence of

the team being given tasks that require social interactions [15]. Likewise, teams working within settings that require cooperation and customer-facing such as service delivery and stakeholder engagement were found to be higher in agreeableness, conscientiousness and openness. Similarly, teams working within settings that involve innovation and verbal communication were observed to be high on openness to experience. On the other hand, the research and development team specialised in developing prototypes for projects, showed low scores in agreeableness, extraversion, openness to experience and conscientiousness. Hence, a clear lack of direction among the team members was observed alongside strong disagreements [15].

Moreover, It has been shown in [15] study that if the engineering team is working on tasks that require decision-making and risk-taking such as the development of products, individuals with high scores of neuroticism and extraversion will most likely hinder the harmony across the team. This view is supported by Ayub et al who argued that extraverted individuals are known for their impulsive and deviant personality, and despite them having an outgoing and assertive nature, they are recognised to be dominant in social encounters and often engage in risky situations that contradicts with the team standards and values [16]. Likewise, Dant et al pointed out that due to the hostility of highly extraverted individuals, they become easily dissatisfied and angry [17]. In view of all that has been mentioned so far about highly extraverted individuals, one may suppose that when these traits are high on the individual's spectrum, they can negatively impact any situation that requires problem-solving and patience which would inevitably impact complex engineering problems that require attention when approached. However, Arora and Rangnekar suggested that

highly extraverted individuals strive for career progression and have the ability to effectively solve complex problems and career challenges using their strong interpersonal skills [14].

Furthermore, Boyatzis et al used a survey to assess 143 engineers from a multi-national manufacturing organisation based in two different locations USA and Northern Europe using the (NEO) Personality Inventory; a self-report that examines the Big Five personality traits [1]. According to the obtained results, engineer engagement and job engagement are positively affected by the personality traits of extraversion and conscientiousness. Thereby, engineers with low scores of extraversion and conscientiousness can potentially hinder the harmony across their teams as they will not be effectively engaged with their team members

and tasks. By way of illustration, Litchfield and Javernickl conducted a series of interviews with 165 engineers working at the Engineers without Borders organization (EWB-USA) and found that engineers with higher extraversion scores are more satisfied and engaged with their careers than engineers with lower scores [18]. Consequently, this could be attributed to their talkative and sociable nature that usually results in greater communication and friendships with their team members. Surprisingly, a comprehensive study comparing personality traits of engineers and non-engineers by Williamson et al, in which 4876 engineers were examined, showed that engineers have lower extraversion scores compared to non-engineers, which potentially can be attributed to their preference of working in quiet settings to focus and concentrate more on their work [19].

For neuroticism, Esmaelinezhad, and Afrazeah argued that neurotics in managerial roles have the tendency to adopt a dominating management style with their team members, because they lack rational judgment, and, thereby they may adopt a dominating style, to take charge and establish their authority and credibility [20]. These results reflect those of who also found that task conflict is more likely to evolve into relationship conflict for individuals with less effective emotional regulation. Therefore, highly neurotics engineering managers could be a major factor hindering the harmony across engineering teams [21-27]. Mainly because the existing conditions of engineering projects are known to be associated with high level of stress and pressure especially that engineering managers are responsible for almost every aspect of the project. This is exemplified in the study undertaken by Sinesilassie et al which listed the responsibilities of an engineering manager as follows: ensuring the completion of projects in budget and on time, conducting regular meetings 'with team members and stakeholders, conducting budget updates and most importantly understanding and communicating the scope of the project to the team [28]. In general, therefore, it seems that neurotics are most likely to vent their frustration on others letting their emotions drive their decisions when under stress and pressure.

Altogether, the above discussions suggest that due to the complex nature of engineering projects, the five personality traits can either impact the team harmony in a positive or a negative way depending on the team settings, tasks and requirements. Hence, in a recent investigation into Six Sigma projects, Witt and Baker (2018) identified personality traits as major indicators of team harmony. The results show that agreeableness influences team productivity, neuroticism and extraversion influence communication effectiveness, openness influences team creativity, conscientiousness

influences project uncertainty, and the five personality traits combined influence the team leadership effectiveness and the overall team performance. Thus, the above discussion points that each personality influences team harmony in a different way. Firstly, team communication is significant in any engineering project for sharing information, accomplishing tasks and establishing mutual trust [21]. Secondly, as noted by Nesterkin and Porterfield team productivity is necessary to identify the key outcomes of projects and how to accomplish them [22]. Thirdly, team creativity is correlated with innovation and the team ability to think out of the box [19]. Finally, Witt and Baker pointed that project's uncertainty is the team inability to completely understand or accurately predict some aspects of a project [29]. Furthermore, these personality influences can best be seen in the case of two of the most substantial engineering practices in today's modern world: Sustainability and Lean production. One of the critical factors for a successful implementation of lean and sustainability is ensuring that everyone is involved and committed to the process, and most importantly has the flexibility and acceptance to change, thereby, individuals being low on openness and agreeableness and high on neuroticism are most likely to hinder the transition (Dombrowski and Mielke 2014). Hence, Jones et al. argued that a major transformation like lean depends on the individual perception of continual improvement and change [23]. However, as noted by Uhrin et al. due to the complexity of implementing lean most of the research has been dedicated to the technological aspects of the process neglecting the equally important human aspects of the transformation process [24]. The majority of the reported challenges regarding lean are human-related. A possible explanation for this might be the fact that lean and sustainable practices are influenced by individuals' commitment and openness to change [24]. Taken together, these results suggest that a high level of openness, conscientiousness and agreeableness, as well as low-level in neuroticism are key for a successful implementation of these practices.

Ayub, et al. suggested an association between neuroticism and being under pressure, the association showed that neurotics are most likely to exaggerate their emotions and are prone to become stressed easily, due to their irrational judgments and sensitivity [24]. But, being under pressure and stress is inevitable when managing such transformation, which can play a significant role in affecting the harmony across engineering teams working towards these practices. This is exemplified in the work undertaken by Jones et al. who used a survey to assess how neuroticism can influence sustainable practices, the Forbes insights

survey targeted 106 executives working in engineering industry trying to achieve sustainability transformation [23]. The participants were unanimous in the view that due to the complexity and requirements of such transformation, accomplishing the transition is challenging, in essence, the engineering managers were under the pressure of balancing between the organisation profits and the responsibility of influencing their team members to change deeply ingrained practices. These results provide important insights into how important it is to have a low score in neuroticism (e.g. balanced personality) to be able to delegate tasks to engineers and influence major changes such as sustainability transformation without showing negative emotions [25].

The purpose of this study is to explore the relationship between personality traits and team harmony in engineering. Hence, the main aim of this study is to investigate the different types of personalities that hinder the harmony across engineering teams.

Research Method

The research methodologies commonly used to draw data from reliable sources are broadly categorized under quantitative or qualitative [26]. There are a number of important differences between quantitative and qualitative methods. For instance, quantitative methods are composed of variables and numbers meaning that they are particularly useful for creating and analyzing statistics [27]. Conversely, Guercini reported that qualitative methods are more useful for identifying and characterizing informant's opinions and views in a natural setting. Moreover, it has been demonstrated that the two methods are mutually exclusive, whereas qualitative methods are used to understand human behaviour; quantitative methods are used to explain it [23]. Considering all of the evidence regarding qualitative methods, they were the most reliable and effective approach to meet the study aims mentioned earlier.

Data Collection and Data Analysis

Since people management and personalities are the main focus of this study it is important to choose a methodology that offers a deep understanding of the impact personalities have on team harmony in practice. According to a recent study by Axelrod on managers with a proven record of exceptional leadership for their team members; reported that adopting a psychological approach that navigates and bolsters each team member personality traits that hold back their performance can help establish and maintain a harmonic team environment [29]. Therefore, it was necessary to choose a methodology that gathers data based on practical experiences and perspectives within the engineering sector. For this study, the data is collected

using semi-structured interviews with ten participants working within the field of engineering. In addition to an evolutionary psychologist who is specialised in dark personalities and individual differences. The participants labeled as P1 to P10 as shown in Figure 1. All participants have led engineering teams ranging from four to hundred members. Moreover, it can be seen from the data in Figure 1 the participants' years of experience range from eighteen to forty years from multi-national organizations such as BEL Engineering, Nissan, Armstrong, as well as research and academic institutions. Moreover, the participants' line of experience includes engineering education, facilitating engineering teams, engineering management, advanced maintenance, operations management, as well as manufacture engineering. The interviews were recorded upon interviewees consent, and then the data was transcribed into written form, categorized and displayed to showcase the key arguments and information. As noted by Rowley, recordings should be used to extract the important points and any other practical details that might be used in subsequent interviews [30].

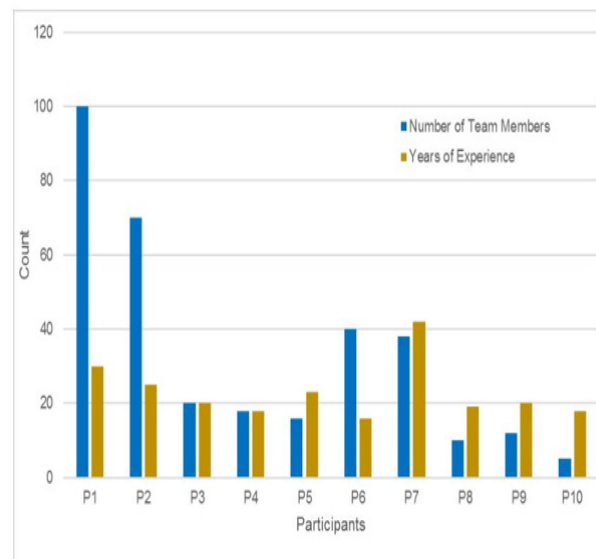


Figure 1: The data used for this study.

Ethical Considerations

Since interviews deal with personal and professional information, ensuring appropriate transparency, confidentiality and trust for the participants should be a priority for any researcher. Hence, a great deal of previous research into qualitative research has focused on ethical issues. As noted by Alshenqeeti interviews are practically a portal into participant's private and professional lives that need a great deal of sensitivity when approached [31]. Therefore, ethical considerations should be implemented

at all stages of the interview process. These considerations include mutual agreements on every aspect of the interview in terms of how the data will be used, who have access to it, and how it will be presented. Additionally, Allmark et al. suggested that the intimate nature of interviews might cause ethical challenges to researchers as some participants may disclose

information that is not supposed to be shared [32]. Consequently, all participants of this study were assured confidentiality and anonymity.

Findings

Personality traits and team harmony in engineering

It has been proposed that team harmony is about establishing perfect unity and satisfactory agreements [33]. Hence, the first set of questions aimed to explore participants' views regarding team harmony. Interestingly, some participants who work within the same organisation expressed different perspectives. For instance, one interviewee argued that 'working within harmonious environment is the norm rather than the exception'. Another participant, however, from that same organization suggested with a laugh implying uncertainty that 'team harmony is something that has never been seen'. Whilst a minority mentioned that team harmony is elusive, all agreed that it is essential to getting things done and that it needs work all the time. Accordingly, the participants were unanimous in the view that team harmony is everybody in the team working together towards a common set of goals, and therefore team harmony is about ensuring everybody has an understanding what the tasks are and how they are going to achieve them, and how much time they have in the day to achieve them, and most importantly people passing information in an effective and efficient manner. This view is supported by DeFranco and Laplante who reported that team harmony is determined by the level of synergy and cooperation within a team who have a mutual goal to achieve [28].

Unquestionably, these views indicate that when information is not passed engineering teams will face clashes and conflicts because people will start getting agitated and confused and as a result will end up going off in a disharmonious direction. Consequently, in all cases, the informants reported that the challenging nature of engineering projects requires a high level of team harmony, asserting on the essential role of good information pass between team members as it is vital for the team to perform their tasks efficiently. Furthermore, the psychologist noted that team harmony is about having a team where there is not too much conflict. However, the psychologist reported

that 'there will always be disagreements in teams about how they do things or how to make decisions and that is fine' and therefore harmony is more about how teams deal with disagreements. For example, Messarra pointed out that some teams resolve disagreements in a quite harmful way, and they put each other down and use criticism [2]. On the other hand, some teams will accept that they have disagreements and will find useful ways in which to resolve them. The six pillars of team harmony in engineering extracted from interviews are as follows: working together towards a common set of goals, task understanding, effective communication, sharing information, less conflict, and effective conflict resolutions.

The current study found that the Big Five model is a suitable model to assess people in the workplace as it is based on a huge amount of research. According to the psychologist, the theorists who developed the Big Five model measured people on many aspects of personality probably hundreds of possible personality traits and accordingly created the model. Moreover, the psychologist pointed out that team leaders who use the Big Five model to measure their team members can have a fairly good understanding of who they are and it can allow them to predict how they will behave. These results reflect those of a recent study by Esmaeelinezhad and Afrazeh who also suggested that the Big Five model is one of the most widely used personality models that can strongly predict work behaviours and intentions [20]. However, there were some negative comments about the model in which the psychologist suggested that it doesn't fully capture the dark side of personality. For example, the Big Five model can capture dark personality to some extent in terms of someone being less agreeable and less neurotic and more extrovert but that doesn't really capture true darkness in the sense of sadism and psychopathy. In the same vein, Paulhus argued that team members with dark personalities fail at getting along with their peers but they succeed in getting ahead and they usually score low on agreeableness and conscientiousness [34].

As mentioned above, individuals who score highly on openness to experience bring many benefits to their team in terms of flexibility and originality [16]. Moreover, Williamson suggested that openness to experience is among the most important traits for engineers since engineering projects constantly require the acquisition of new knowledge and developing new solutions [19]. Consequently, the participants, on the whole, demonstrated that engineering is all about ideas, innovation and taking something to the next level and finding that right solution for a particular problem. Additionally, one interviewee said that 'people

who are creative and have an artistic flavour are going to have a positive impact on any engineering team as they will bring many good (out of the box) ideas'. However, the personality trait openness to experience has a different side that is argued to be less beneficial to team harmony. As noted by Balmaceda et al. individuals who score low on openness to experience are described as cautious, unimaginative, and consistent [4]. Hence, such individuals prefer familiar surroundings and are more likely to pass up on opportunities, and adhere to set routines and schedules [13].

Therefore, it can be argued that individuals with low scores of openness to experience might hinder the harmony across engineering teams due to their structured personality. However, the participants were all supportive of such personality. For example, one interviewee argued that if an entire team was made up of people who have only that creative side and not the cautious side, it would probably bring limited value to the team. In essence, that in engineering a balance of those two personality types can bring significant benefits to the team. For example, the creative people feed in the ideas and the cautious people test their validity. As noted by one participant having a team with the same personality traits will hinder the chances of success as everybody will be trying to do the same role and the same things which will potentially affect the harmony across the team. This view is supported by Clark and Polesello who reported that diversity increases team's competitive advantage over those who lack diversity [9]. Consequently, the informants reported different cases that justify the importance of having a blend of openness to experience within an engineering team. For instance, one participant suggested that in maintenance, cautious and consistent people are needed to solve and think through certain problems as for creative and curious people they are needed to innovatively fix urgent problems. In the same vein, an interviewee from a manufacturing organisation suggested that an ideal team of production engineers would be a combination of creative and cautious people wherein the latter will take on the quality assurance role at the end of the chain to make sure that the features and dimensions are of quality and the more creative people can deal with tasks or problems on the shop floor that requires finding solutions. Conversely, one interviewee argued that in the education sector one of the problems engineering schools face is keeping the curriculum up to date which is can be hard to achieve if people are cautious and consistent as they might teach the same thing for years and that will definitely have a negative impact on others who might be developing new programs and looking at what's new in the

engineering industry and trying to bring it from the outside world into the curriculum.

Considering all of these views, it seems that both sides of openness to experience can either hinder or maintain the harmony across an engineering team depending on what the engineering team is focused on and how team leaders deal with both sides of the personality. Hence, all participants agreed that neither high nor low in openness to experience does hinder the harmony across an engineering team; in fact, team leaders should coach and nurture their team members who have this personality to bring the best out of them. Consequently, the participants pointed out several explanations for this view. A small number of those interviewed suggested that being cautious, shy and constant usually comes from lack of knowledge, while others suggested that due to the mixture of different traits within people it would be difficult to assign tasks according to everyone's personality thereby team members need to be trained to adapt to all possibilities. Overall, the

findings suggest that there can be some clashes between the two sides of the personality, but that is up to the team leader to facilitate that relationship and acknowledge the importance of each side. There are various different types of engineering, each with very distinct skill sets, but there is no doubt that conscientiousness is central to the entire discipline of engineering [35]. The participants on the whole demonstrated that any engineering team absolutely needs orderly and hardworking people who can take responsibility and are able to meet the team objectives and deliver clear outputs. Additionally, the participants agreed that engineering can be challenging, unpredictable and sometimes unreliable so not having these traits can negatively impact the team success and ultimately the team harmony. Moreover, all participants agreed that highly conscientious team members help create a harmonies team in the sense that they have attention to detail and that enable them to understand each other working style and personal preferences. However, some participants expressed concerns regarding highly conscientious individuals arguing that sometimes they get too involved in perfectionism and detail. Hence, all agreed that this side of the personality can be a hindrance and very problematic. This result reflects those of Wagner and Causey-Upton who also reported that perfectionists develop high levels of stress that cause anxiety and mood disorders which make them less favourable by their peers [36].

Consequently, one participant argued that 'sometimes the job needs to be done and the objectives need to be met and team members who fall in the loop of endless

refining can hinder the team harmony especially if the team is up against the time pressure'. Furthermore, when asked about team members with low scores in conscientiousness who are described as unpunctual, disorganized, impulsive, and unreliable [37]. A small number of those interviewed suggested that both team leaders and members should try to cope with their personality and even suggested that sometimes you need to have team members who are impulsive that can take risks. Additionally, the same informants reported that everybody has a little element of being disorganized in the sense that when people are under pressure, they might become unsystematic, especially when they are bridging more than one role wherein it becomes harder to have full control. On the other hand, the majority of participants argued that one's personality should not be an excuse for being disorganized as someone's work can have a big impact on somebody else's work and being disorganized would absolutely have an impact on the team harmony as it will cause many conflicts. This also accords with Ayub et al study, which reported a strong relationship between conscientiousness and conflict escalation [16].

In addition, the participants agreed that team members low in conscientiousness can be a hindrance as they will create tensions all over the place; especially within an engineering setting that has high standards. Moreover, the participants argued that working with unpunctual and disorganized team members can be very frustrating and significantly affect others because things aren't getting done properly. Conversely, one participant suggested that it should not be considered as a hindrance if the team leader or team members did not communicate the team expectations and standards. Furthermore, one participant suggested that anybody who is impulsive and disorganized wouldn't be able to fit in an engineering environment as quality is critical, and such environment cannot afford having team members who work on random things and don't follow procedures and critical processes. Taken together, as noted by Williamson et al there are some aspects from both sides of conscientiousness that can hinder the harmony across an engineering team [19]. For example, in terms of conflict, team members that have low scores in conscientiousness will most probably be unprofessional due to their impulsiveness and unreliability but can be beneficial in urgent situations. As for conscientious team members they are more likely to tackle conflicts, stay focused and support others, but can be problematic when they get too involved in detail that cause frustration to others.

The important role of extraversion in team performance and team harmony is unarguable, as it has been shown

to have a positive impact on team performance and engagement especially for roles requiring social interactions [38]. Since extraversion is mostly considered with social relationships having too many or too few in an engineering team can both be inefficient. According to Ayub et al., a team with a very low or a very high level of extraversion will most properly struggle in terms of harmonies functioning [16]. In order to assess the impact of extraversion on team harmony; the participants were given the different characteristics of highly extraverts as opposed to those who score low in extraversion. Accordingly, one participant argued that highly extraverts thrive for recognition and status and usually seek leadership roles, which is "fine as long as its balanced" the participant stated. This finding was also reported by Arora and Rangnekar who also found that extraverts actively seek career advancement and attention [14].

However, the participant suggested that some disruptive extraverts can cause disharmony within teams as they have the tendency to become dominant in order to reach their goals even if it causes discomfort to other team members. These results are in accord with the psychologist views indicating that extraversion is a double-edged sword. In essence that it is a really good personality in the sense that team members who are extroverts tend to be more confident, outgoing, and good at making relationships with others, also they often make good leaders. On the other hand, extraversion can be associated with darker traits meaning that team members who are incredibly extroverts can take all of the attention and people who are more introverts can be overlooked by the team leader. Hence, this finding broadly supports the work of Williamson et al. who found a strong relationship between extraversion and career satisfaction [19]. The study reported that extraverted engineers have higher levels of career satisfaction as opposed to introverted engineers. A possible explanation for this relationship may be the fact that highly extraverts are known to be talkative, outgoing and confident which results in effective connections and friendships with team members and team leaders. However, some participants felt that being "over the top salesperson" would probably be very annoying to other team members. Moreover, they argued that having highly extraverts in some engineering roles can be a problem as engineers need to keep a clear head while working.

Furthermore, there were some suggestions that highly extraverts can cause transformative discomfort in some situations thereby it is important to keep it in its proper perspective or it will become problematic causing disharmony

across the team. As for introverts, the participants were informed that the literature classified them as team members who tend to work more independently and methodically as well as have troubles making and building relationships [15]. Hence, one could argue that introverts don't hinder the harmony as engineering requires a methodical and focused approach. Also, as mentioned in the literature review, Williamson et al examined 4876 engineers and found that the majority scored low in extraversion [19]. However, some interviewees argued that engineering is not about one person needing to be focused or needing some quiet time, and at the present time all types of engineering require having a team of people who can brainstorm ideas and find solutions together. In the same vein, one interviewee argued that general engineering can be a noisy and busy place and if someone who is introvert wants to go down that route they should be certain that they are going to be working in a noisy environment with a mixture of lots of different people even if the job is in an office or a factory.

Overall, the participants demonstrated that both extroverts and introverts are not necessarily to cause disharmony and both types can be beneficial in an engineering team. For example, one participant suggested that extraverts can work as sales engineers or engineering managers as for introverts they are ideal for quality assurance that includes reviewing documentation, specifications, and the compliance and traceability certificates, however, the participant reported some negative comments about introverts suggesting that 'They should not be given a role that requires communicating with customers as they probably wouldn't give a good profile of the business'. Other participants, however, argued that just because someone is quiet and prefer to work individually doesn't mean they wouldn't be a good sales engineer or a good team leader. Accordingly, all participants agreed that harmony can be achieved when a combination of both sides of the personality is balanced and failing to do so can cause disharmony. In essence that creating a team with only solitary, independent and quiet people would create a dull setting and therefore teams need a mixture that keeps the morale and spirit alive.

Previous research findings into the personality trait agreeableness demonstrated that team members high on agreeableness have a cooperative and productive nature, also identified as sympathetic, kind, and affectionate [18]. Moreover, Wolff and Kim noted that social harmony is very important for highly agreeable individuals as they have the tendency to put aside their interests for other team members [39]. Together, these qualities indicate that highly agreeable team members influence a harmonious team environment.

However, the findings of the current study do not support the previous research. Hence, some participants expressed that highly agreeable individuals can hinder team harmony if they are not knowledgeable enough of what they are saying they are going to do. For example, if they are asked to do certain tasks and the tasks build up over time because they agree to do everything, they will get stressed because people will just give them more work, and that can leave a negative impact on the team as well as the team leader, because eventually the job will not be done or it will not be done correctly thereby, the aim is not going to be achieved, which will add more workload on the team members and that can hinder the harmony across the team.

On the other hand, other participants considered highly agreeable team members as an advantage. These views surfaced mainly in relation to the sympathetic side of highly agreeable individuals. According to Bhatti et al. individuals that score high on agreeableness are good communicators who can establish and foster healthy relationships with their peers [38]. One participant suggested that being sympathetic is very important for team leaders as they need to be approachable and able to tell if somebody within the team got a problem. In contrast to highly agreeable team members, individuals with low scores of agreeableness are less flexible and can be problematic in a team environment and have the tendency to offend others in arguments and discussions [40]. What is surprising is that low in agreeableness was the psychologist first choice of a personality that mostly hinders the harmony across an engineering team. The reason for this choice according to the psychologist has something to do with individuals with low scores of agreeableness being very rude, suspicious, and insensitive, which, in turn, create conflict which is one of the main reasons that cause disharmony across teams. This finding is consistent with that of Messarra et al. who reported that conflicts are a very common issue found in teams that are likely to arise between team members because of differences in personalities [2].

Consequently, a variety of perspectives were expressed regarding individuals with low scores of agreeableness. One interviewee reported that 'although it is not ideal it is only one facet of their personality and does not get in the way of the value they add'. In the same vein, some interviewees argued that it is a fact of life that teams will have people who are rude and ruthless and even though there are not ideal team leaders should offer them guidance and deal with them rather than just letting them go or passing them after somebody else. These results are in agreement with Williamson's et al. findings which suggested that managers of engineers should have the knowledge of their team

members' personality traits and accordingly assign tasks to them [19]. Conversely, a minority of respondents suggested that team leaders shouldn't employ those people and if they got through the interview and joined the team, the team leader should look into ways to get them out of the team as engineering teams shouldn't have people who are suspicious and insensitive because such traits will just ruin any kind of team harmony. A possible explanation for this might be that the former view reflects those who manage small teams between four to ten people; however, the latter view reflects those who manage bigger teams which consist of fifty to two hundred people as it would be difficult to understand each member's personality [41-43].

Furthermore, there were some suggestions that suspicious team members can lead to disharmony because there's that lack of trust and trust is really important in any team setting as team members should establish mutual trust between each other in order to complete tasks and create a supportive working environment. These results are in line with those obtained by Krasman who found that trust between team leaders and team members is of crucial importance and is critical to creating a harmonious team environment also, team members who trust their team leaders have higher productivity, collaboration and job satisfaction. In summary, for the informants in this study, agreeableness can be a double-edged sword meaning that it can be beneficial when highly agreeable people are knowledgeable and can complete the responsibilities they agreed on [44]. Moreover, being sympathetic, kind and having the willingness to help others are essential traits to maintain team harmony. Additionally, whilst a minority mentioned that people with low scores of agreeableness hinder team harmony and should be dismissed from the team, all agreed that it is one facet of their personality and can be monitored by using effective communication, training and guidance and most importantly it should not be considered as a personality that hinders the harmony across an engineering team unless people are extremely rude and suspicious.

Previous studies have demonstrated that neuroticism is a problematic personality as it is associated with negative feelings and reactions such as excessive worry, anxiety, insecurity, and shyness [42]. Like all other all personality traits, neuroticism exists on a spectrum, meaning that people can be highly neurotic, little neurotic or in between. As indicated previously and broadly known engineering is classified as a high-pressure challenging occupation so having team members with high levels of neuroticism would probably affect team harmony. The literature also suggested that highly neurotic individuals will most likely struggle and

affect team harmony; especially for teams working within engineering sectors like manufacturing and maintenance due to breakdowns and machine faults [43]. Hence, the collected opinions differed as to whether neuroticism hinders the harmony across engineering teams or not. One participant suggested that 'neuroticism hinders the harmony if it is combined with a dominant personality' as dominant people have the tendency to make quick decisions without considering others' ideas or solutions when they are under stress and that can cause a lot of conflicts. Similarly, another participant said that 'highly neurotic team members can be a hindrance when they constantly linger in negative energy and complain when they are under stress'.

On the other hand, the majority of participants, as well as the psychologist, agreed that neuroticism is a double-edged sword. According to the participants having team members with low levels in neuroticism means that they are confident and not afraid to take a few risks which can be very helpful in urgent situations. Moreover, having team members with a bit of neuroticism and anxiety can be useful as they will be more vigilant to detect issues which might be risky or harmful. Additionally, the psychologist suggested that an engineering team with a combination of some people who are high and some people who are low on neuroticism will probably be a quite good team. For example, one participant that works in a manufacturing organization suggested that this combination can be utilized in a logistics team wherein people who are high in neuroticism can do the planning and the team members who are low in neuroticism can do the execution part. Moreover, the participants pointed out that people low in neuroticism have the tendency to help and support highly neurotic team members when they are anxious and stressed out.

A possible explanation for why the majority of participants disagree with the literature in terms of neuroticism being a hindrance is that dismissing people because they are anxious and insecure is neither ethical nor professional especially if they are perfectly good at the job. Moreover, one participant argued that the days of terminating people because their personality clashes with other team members are long gone. Hence, a study by Wolff and Kim suggested that there is no correlation between neuroticism and networking behaviors [39]. Furthermore, all participants agreed that a good team leader should be able to identify with that personality type and recognize if a team member is nervous or anxious and doesn't want to tackle complex situations. It was also suggested that team harmony depends on how the team leader deals with neurotic people and their capability to bring them slightly out of their shell and make them feel more

confident in themselves. In addition to that, the participants demonstrated that a good team would have people who would probably fit into every single category and it is the team leader responsibility to identify what positions each team member fits mostly in.

In summary, these results show that neuroticism should not be considered as a hindrance because it is a fact of life that everybody has insecurities and it is rare to employ people with perfect personality and skill sets. However, neuroticism can be a hindrance if the engineering team is full of people who are highly neurotic or if the team leader is Incompetent. Moreover, the majority of interviewees agreed that It is not the personality that hinders the harmony it is how people perceive team members who are nervous and anxious as they might perceive them not to be doing their job or strong enough to be part of the team. Therefore, having a solid leadership that offers support and guidance to highly neurotic team members who are nervous, insecure, shy and anxious is very important to maintain team harmony. These results reflect those of Cardon and Bribiescas who also reported that even though, managing highly neurotic team members can be challenging for team leaders, it is their responsibility to make sure everyone on the team is being as comfortable as possible and most importantly as productive as possible even if it requires treating everyone differently [44].

Conclusion

The purpose of this study was to determine personality types that would hinder the harmony across an engineering team. This study has identified the meaning of team harmony in engineering from the perspective of the literature in which it was argued it is about respecting and understanding others in their differences. On the other hand, this study found that it is mainly about team members working together towards a common set of goals, effective communication and sharing of information, as well as effective conflict resolution. The most major finding to emerge from this study is that some of the personalities that are considered a hindrance in a team environment are not necessarily problematic or a hindrance in an engineering team. For example, in the literature, highly neurotic team members are considered as a hindrance due to their association with excessive worrying and anxiety. However, this study found that engineers with these traits are important for team harmony as they are more vigilant to detect issues that might be risky or harmful and they are very beneficial for planning as they take extra attention of important details.

This is also evident in the principles identified in the

literature to maintain team harmony across engineering teams with diverse personalities. Hence, this study found that understanding team members' personality is difficult and not always possible especially in large engineering teams and more precisely that not everyone is specialised in psychology to be able to identify personality types. Also, the study found that there are no set formulas to deal with conflict based on personality type. Notwithstanding these findings, the study offers valuable insights into how to maintain harmony across engineering teams with diverse personalities. Overall, this study critically examined the existing literature and built arguments based on its primary data that was collected through semi-structured interviews with experienced engineers as well as an experienced psychologist who validated the study.

Acknowledgement

The authors would like to thank University of Sunderland and Northumbria University to provide their support for this research work.

References

1. Boyatzis R, Rochford K, Cavanagh KV (2017) 'Emotional intelligence competencies in engineer's effectiveness and engagement', *Career Development International*, 2(1): 70-86.
2. Messarra LC, Karkoulian S, El-Kassar AN (2016) 'Conflict resolution styles and personality: The moderating effect of generation X and Y in a non-Western context'. *International Journal of Productivity and Performance Management* 65(6): 792-810.
3. Baay PE, van Aken MAG, de Ridder DTD, van der Lippe T (2014) 'Understanding the role of social capital in adolescents' Big Five personality effects on school-to-work transitions'. *Journal of Adolescence* 37(5): 739-748.
4. Balmaceda JM, Schiaffino S, Godoy D (2014) 'How do personality traits affect communication among users in online social networks?'. *Online Information Review*.
5. Huff JL, Zoltowski CB, Oakes WC (2016) 'Preparing Engineers for the Workplace through Service Learning: Perceptions of EPICS Alumni'. *Journal of Engineering Education* 105(1): 43-69.
6. Chow RPM, Yau OHM (2010) 'Harmony and cooperation: their effects on IJV performance in China'. *Cross Cultural Management: An International Journal* 17(3): 312-326.
7. Ergün A, Balçın MD (2017) 'Turkish adaptation of questionnaire on attitudes towards engineers and scientists'. *International Electronic Journal of Elementary Education* 10(1): 103-113.
8. Weeks KP, Weeks M, Long N (2017) 'Generational perceptions at work: In-group favoritism and out-group stereotypes', *Equality, Diversity and Inclusion: An International Journal*.
9. Clark JM, Polesello D (2017) 'Emotional and cultural intelligence in diverse workplaces: Getting out of the box', *Industrial and Commercial Training*.
10. 'Understanding approaches to managing diversity in the workplace: An empirical investigation in Italy | Emerald Insight'.
11. Brown JAE (2008) 'Gender and diversity research in the Southern Management Association', *Equal Opportunities International*.

12. Bradley JH, Hebert FJ (1997) 'The effect of personality type on team performance', *Journal of Management Development*.
13. Myszkowski N, Storme M, Davila A, Lubart T (2015) 'Managerial creative problem solving and the Big Five personality traits', *Journal of Management Development*.
14. Arora R, Rangnekar S (2016) 'Linking the Big Five personality factors and career commitment dimensions: A study of the Indian organizations. *Journal of Management Development* 35(9): 1134-1148.
15. Yilmaz M, O'Connor RA, Colomo-Palacios R, Clarke P (2017) 'An examination of personality traits and how they impact on software development teams', *Information and Software Technology* 86: 101-122.
16. Ayub N, AlQurashi SM, Al-Yafi WA, Jehn K (2017) 'Personality traits and conflict management styles in predicting job performance and conflict', *International Journal of Conflict Management*.
17. Dant RP, Weaven SK, Baker BL (2013) 'Influence of personality traits on perceived relationship quality within a franchisee-franchisor context'. *European Journal of Marketing* 47(1-2): 279-302.
18. Litchfield K, Javernick-Will A (2015) "'I am an Engineer AND": a mixed methods study of socially engaged engineers', *Journal of Engineering Education* 104(4): 393-416.
19. Williamson JM, Lounsbury JW, Han LD (2013) 'Key personality traits of engineers for innovation and technology development', *Journal of Engineering and Technology Management* 30(2): 157-168.
20. Esmaelnezhad O, Afrazeh A (2018) 'Linking personality traits and individuals' knowledge management behavior', *Aslib Journal of Information Management* 70(3): 234-251.
21. DeFranco JF, Laplante P (2018) 'A software engineering team research mapping study', *Team Performance Management: An International Journal*.
22. Nesterkin D, Porterfield T (2016) 'Conflict management and performance of information technology development teams'. *Team Performance Management* 22(5-6): 242-256.
23. Jones SA, Michelfelder D, Nair I (2017) 'Engineering managers and sustainable systems: the need for and challenges of using an ethical framework for transformative leadership', *Journal of Cleaner Production* 140: 205-212.
24. Uhrin A, Bruque-Cámara S, Moyano-Fuentes J (2017) 'Lean production, workforce development and operational performance', *Management Decision* 55(1): 103-118.
25. Hwang P, Wu X (2010) 'Investigation of temperature and thermal stress in ventilated disc brake based on 3D thermo-mechanical coupling model', *Journal of mechanical science and technology* 24(1): 81-84.
26. Murshed F, Zhang Y (2016) 'Thinking orientation and preference for research methodology', *Journal of Consumer Marketing*.
27. Chatha KA, Butt I, Tariq A (2015) 'Research methodologies and publication trends in manufacturing strategy', *International Journal of Operations & Production Management*.
28. House J (2018) 'Authentic vs elicited data and qualitative vs quantitative research methods in pragmatics: Overcoming two non-fruitful dichotomies', *System* 75: 4-12.
29. Axelrod W (2015) 'How exceptional managers use everyday psychology to develop their people'. *Industrial and Commercial Training* 47(3): 121-126.
30. Rowley J (2012) 'Conducting research interviews', *Management Research Review* 35(3-4): 260-271.
31. Alshenqeeti H (2014) 'Interviewing as a Data Collection Method: A Critical Review', *English Linguistics Research* 3(1): 39.
32. Allmark P (2009) 'Ethical Issues in the Use of In-Depth Interviews'. *Research Ethics Review* 5(2): 48-54.
33. Chin T, Liu R (2015) 'Understanding labor conflicts in Chinese manufacturing: A Yin-Yang harmony perspective', *International Journal of Conflict Management*, 26(3): 288-315.
34. Paulhus DL (2014) 'Toward a taxonomy of dark personalities', *Current Directions in Psychological Science*, 23(6): 421-426.
35. Borges R (2013) 'Tacit knowledge sharing between IT workers: The role of organizational culture, personality, and social environment'. *Management Research Review* 36(1): 89-108.
36. Wagner ME, Causey-Upto R (2017) 'Perfectionism in occupational science students: occupational therapy implications'. *Irish Journal of Occupational Therapy*.
37. Agyemang FG, Dzandu MD, Boateng H (2016) 'Knowledge sharing among teachers: the role of the Big Five Personality traits'. *VINE Journal of Information and Knowledge Management Systems*.
38. Bhatti MA, Kaur S, Battour MM (2013) 'Effects of individual characteristics on expatriates' adjustment and job performance', *European Journal of Training and Development*.
39. Wolff HG, Kim S (2012) 'The relationship between networking behaviors and the Big Five personality dimensions'. *Career Development International*.
40. Sri Ramalu S, Chuah CW, Che Rose R (2011) 'The effects of cultural intelligence on cross-cultural adjustment and job performance amongst expatriates in Malaysia'. *International Journal of Business and Social Science* 2(9): 59-71.
41. Krasman J (2012) 'Do my staff trust me?: The influence of organizational structure on subordinate perceptions of supervisor trustworthiness'. *Leadership & Organization Development Journal* 3(5): 470-488.
42. Farruk M, Ying CW, Mansori S (2017) 'Organizational commitment: an empirical analysis of personality traits'. *Journal of Work-Applied Management*.
43. Martens ML, Carvalh MM (2016) 'The challenge of introducing sustainability into project management function: multiple-case studies'. *Journal of Cleaner Production* 17: 29-40.
44. Cardon N, Bribiescas F (2020) 'RESPECT FOR PEOPLE: THE FORGOTTEN PRINCIPLE IN LEAN MANUFACTURING IMPLEMENTATION', *European Scientific Journal*, ESJ, 11: 13.

*Corresponding author: Naveed Niva, Email: Nida.Naveed@sunderland.ac.uk

Next Submission with BGSR follows:

- Rapid Peer Review
- Reprints for Original Copy
- E-Prints Availability
- Below URL for auxiliary Submission Link: <https://biogenericpublishers.com/submit-manuscript/>

Citation: Khatib SA, Naveed N and Anwar N. The Study of Diverse Personalities that Hinder Harmony across Engineering Team. *Op Acc J Bio Sci & Res* 5(1)-2020.

DOI: 10.46718/JBGSR.2020.05.000112