Agile and non-agile teams: The relationship between well-being and job performance

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ABSTRACT,
This research aims at identifying the differences between agile and non-agile teams in well-being, job performance and autonomy and to what extent the relationships may diverge or converge. The study has been conducted by using two samples from two Dutch companies, which differ in the way of working and leadership styles since one represents an agile management and the other one a non-agile management. Research is performed by first analyzing the relationship between well-being and job performance and additionally identifying the role autonomy plays in this relationship. Data retrieved from surveys of employees were analyzed via SPSS. The results show that for both agile and non-agile teams a relationship between well-being and job performance is present, with a stronger and significant positive relationship in agile teams. Additionally, it has been shown that there is a significant higher level of autonomy in the agile teams than in the non-agile teams. Considering the moderating effect of autonomy on the relationship between well-being and job performance, no significant effect has been found for neither the non-agile nor the agile study. However, this research has shown that well-being influences the job performance and that therefore it is of great importance to create a good work environment within the firm to increase job performance and thus the organization's performance.

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Keywords
Agile, autonomy, job performance, leadership, well-being

1. INTRODUCTION

'Agile' is a term that emerged in the 1990s as a software methodology and was mainly used in IT departments (Schwaber, 1997). However, nowadays agile is not only used in the IT departments, but also in organizations of different nature as a new way of working. The shift from a traditional or non-agile way of working to agile has been already implemented in big companies such as Spotify, Netflix, Google, and Zappos. This shift entails a change from traditional team structures to so-called 'squads'. Each squad consists of up to nine multi-disciplinary employees and works within 'sprints', i.e. meetings, on selected projects. During these sprints frequent user feedback is given as well as a daily update on the progress is made (Birkinshaw, 2018). According to Yusuf et al. (1999), the agile style of working is seen as a winning strategy when facing a fast-changing market and aiming at a significant performance enhancement.

As the agile way of working is rather new, it is of great importance to measure in what way it influences individual job performance. A high individual job performance is likely to result in a higher team performance which in the end means that the organization benefits from it (Moe et al, 2010). Additionally, it is interesting to see how individual job performance in agile teams differs from the job performance of non-agile teams mainly because more and more firms are adapting to the agile way of working (Rigby et al., 2016).

Individual's job performance is defined as whether an individual's expected goals match an individual's outcomes (Yang and Hwang, 2014). The level of perceived individual performance can be influenced by several factors such as leadership style and well-being (Greenhaus et al., 1987).

With regard to leadership style, one theory that focuses on the influence of leadership is the" substitutes for leadership" theory, which posits that there are certain substitutes that can lead to either positive or negative influence over individuals' performance and effectiveness (Kerr and Jermier, 1978). This theory considers that there are situational factors such as job design or experience that can either enhance, neutralize, or substitute for the leader's behavior (Avolio et al., 2009). One of the factors is job autonomy or the independence from others which can be determined by measuring to what extent an individual is able to act independently in performing their job (Kerr and Jermier, 1978).

Job performance has also been found to be positively influenced by well-being, which can be defined as the state of being comfortable, happy or healthy. It is thus crucial for firms to ensure that employees score high in their level of well-being (Wright and Cropanzano, 2000). Compared to non-agile teams, well-being is expected to play an important role in agile teams due to their higher level of autonomy. Thompson and Prottas (2006), who inter alia analyzed the relationship between job autonomy and well-being, stated that job autonomy influences an employee's well-being. Research proves that employees who can decide themselves how and when to do their work are likely to be more satisfied with their jobs than employees who have a low job autonomy (Clark, 2001). As the agile concept is based on self-organizing teams (Moe et al., 2008), there is not one leader that manages the teams but instead the teams work with a high job autonomy. Due to a higher level of autonomy, it is important for squads to have flourishing team members, because people need to be willing to pursue personal growth without a leader's instructions. Thus, flourishing teams mean that team members themselves want to grow, as well as develop and improve their own performance without a leader telling them to do so.

According to Huppert and So (2013), who did research on the correlation between flourishing and well-being, positive emotions are required in order to be able to grow and thrive. Thus, people with a positive well-being are likely to be more flourishing and have a higher job performance than people with a negative well-being (Fredrickson and Losada, 2011). The fact that agile teams have a higher level of autonomy than non-agile teams indicates that flourishing might play a bigger role in agile teams than in non-agile. Given the lack of research comparing the link between well-being, autonomy and performance between agile and non-agile teams, the following research question has been formulated:

How does the different level of autonomy in agile and non-agile teams impact the potential relationship between individual worker's well-being and job performance?

In order to answer this research question, firstly, the difference between job performance of the agile and non-agile teams need to be identified, analyzed and compared to identify whether there is a significant difference between the influence of well-being of agile and non-agile teams. Secondly, the relationship between well-being and job performance needs to be identified for both an agile and a non-agile team. Lastly, the role of autonomy will be evaluated in both agile and non-agile teams to identify to what extent the level of autonomy is influencing the relationship between well-being and job performance.

The theoretical contribution of this research is to identify whether well-being plays a more important role in agile than in non-agile teams. While the idea of agile methods has been brought up for the first time in 1995 by Sutherland and Schwaber as a software development approach (Schwaber, 1997), the use of agile methods as a way of working in organizations is rather new. Therefore, only little research has been conducted on which internal factors can influence job performance and to what extent they can influence job performance.

The report will be structured as follows: First, a literature review is provided on the possible relationship between well-being and job performance and to what extent leadership and the level of autonomy can influence the potential relationship. Secondly, the methodology section describes the scope of the research, followed by the results and an analysis. Finally, a discussion and conclusion will summarize the results together with a limitations future research section.

2. THEORETICAL FRAMEWORK

The following literature topics are relevant for conducting this research: agile teams, non-agile teams, personal well-being, individual job performance, leadership and level of autonomy.

2.1 Definition of key concepts

2.1.1 Well-being

Most researchers have defined well-being as how individuals experience the quality of their lives (Diener, 1984; Lyubomirsky and Lepper, 1999; Helliwell and Putnam, 2004). In Emmons and Diener's (1985) seminal work well-being includes three dimensions, namely positive affect, negative affect and life satisfaction.

Well-being at the workplace plays an important role for several reasons (Danna and Griffin, 1999; Buruck et al., 2016; Bliese et al., 2017). The first reason is that while a person is at work he or she is influenced by his or her personal experience. However, this personal experience also influences an individual's private situation, which means that the personal and work life are interrelated domains. Another reason why well-being at the workplace is important is because a lack of well-being can affect workers in a negative way.

2.1.2 Job performance

Job performance is defined as "the total expected value to the organization (…) that an individual carries out over a standard period of time" (Motowildo and Kell, 2012, p. 92). Another way to define job performance is whether there is a match between an individual's outcomes and his / her expected goals. This means when an employee's outcomes are equal or higher than the expected goal that employee has a high job performance whereas when there is no or a relatively low match between the goals and the outcomes the employee has a low job performance (Yang and Hwang, 2014).

2.1.3 Autonomy

Autonomy can be defined as "the degree to which the task provides substantial freedom, independence, and discretion in scheduling the work and in determining the procedures to be used in carrying it out" (Hackman and Oldham, 1980, p. 79). Commonly there is a distinction between individual and team autonomy: individual autonomy refers specifically to the individual tasks, whereas team autonomy is about the task of a team (van Mierlo et al., 2006). In discussing team autonomy, Gibson et al. (2009) make a distinction between two types of decision making, namely by an autonomous workgroup or by an autocratic leader. In the autonomous workgroups, key characteristics are "a high degree of self-determination by employees in the management of their day-to-day work" (Wall et al., 1986, p. 280). Hence, the autonomous style of making decisions is the opposite of the traditional form of leadership, as in the traditional way there is an autocratic leader who makes the decisions and works with a top-down approach (Gibson et al., 2009).

These two types of decision making can be connected with the agile and non-agile, more traditional, concepts of working. While the autonomous workgroups are represented in the agile structures, the autocratic leader is part of the more traditional way of working, for example in a bureaucratic system. Thus, it can be said that agile teams are more likely to have a high level of autonomy whereas non-agile teams have in general a lower level of autonomy (Tessem, 2014). One study conducted at the company Nokia tested the opinions of the employees on the transformation towards an agile way of working. The results of this study were that "most respondents agree on all accounts with the generally claimed benefits of agile methods. These benefits include higher satisfaction, a feeling of effectiveness, increased quality and transparency, increased autonomy and happiness, and earlier detection of defects. Finally, 60% of respondents would not like to return to the old way of working" (Laanti et al., 2011, p. 276). Therefore, it can be suggested that agile teams have a higher autonomy than non-agile teams and that employees who adapt to an agile way of working are overall satisfied with the changes.

2.2 Well-being, job performance and autonomy

Concerning the relationship between well-being and individual job performance, Wright et al. (2007) did extensive research on the happy-productive thesis and found that performance was highest for the employees who also scored high on well-being. According to the 'happy-productive' hypothesis, employees who are happy have a higher job performance than employees who are unhappy (Cropanzano and Wright, 2001). When operationalized within workplaces, the concept of 'happiness' is often associated with the well-established notion of 'job satisfaction' (Fisher, 2010). However, even though personal and work life are interrelated domains and influence each other (Danna and Griffin, 1999), job satisfaction only focuses on one's job domain and excludes factors outside of work, such as an individual's personal life (Fisher, 2010). Therefore, one way to operationalize happiness, so that factors belonging to both the work and personal life of an individual could be accounted for, is by using positive and negative affectivity (Cropanzano and Wright, 2001). According to Diener (1994) happiness is high when positive affectivity is present and negative affectivity absent, whereas happiness is low when positive affectivity is absent and negative affectivity is present. Taris and Schreurs (2009) conducted a study on an organization to test the happy-productive hypothesis. The results of this study showed that it is important to improve the worker's well-being as it can lead to higher job performance. Additionally, the study suggested that it is not only important for the individuals to increase well-being but also for the organizations and clients (Taris and Schreurs, 2009). Hence, the following hypothesis is put forward:

Hypothesis 1: An individual's well-being has a positive influence on job performance.

One way to link the level of autonomy to job performance and well-being is by using the self-determination theory. This theory states that "job autonomy is a key factor for employee motivation, health, and performance" (Nijp et al., 2012). The theory is based on the idea that a worker's motivation and experience is mediated by three factors of psychological needs, of which one is the need for autonomy of self-determination. The fulfillment of this need can firstly lead to a higher psychological health and well-being and secondly influence the effective functioning of individuals (Ryan, 1995; Deci et al., 2017). Furthermore, there has been some research exploring the effect of team autonomy level on team performance and other outcomes (Guzzo and Dickson, 1996; van Mierlo et al., 2001; van Mierlo et al., 2006) that show that a high team autonomy can be an indicator of increased quality of performance (van Mierlo et al., 2006).Therefore, the subsequent hypothesis has been advanced:

Hypothesis 2: The level of team autonomy moderates the positive relationship between well-being and job performance, so that the higher the level of autonomy the stronger the positive relationship.

3. STUDY 1 – NON-AGILE TEAM

3.1 Methodology

3.1.1 Sampling

The study was conducted by the Change Management & Organizational Behavior (CMOB) department of the University of Twente from 2014 until 2019. The study analyzed a governmental, non-profit institution in the Netherlands in which 114 teams have been analyzed to research inter alia team performance, well-being as well as the leadership style used. The study was conducted by collecting survey data after a team meeting, together with recording and filming a team meeting. In the study a distinction was made between the leaders and the followers since the latter filled out a different survey. Additionally, the leader's performance and other dimensions were rated by their supervisors. In this thesis, study 1 represents the non-agile way of working.

The sample size consists of 114 leaders with an average age of 51 years and a 75/25 male/female ratio. With 77%, most leaders either obtained a Master (37.2%) or University of Applied Science (39.8%) degree. For detailed charts of the sample characteristics see appendix 9.1.

Within the study the data of 114 leaders have been retrieved. However, two leader have been left out because there was one team that had two leaders. The reason for leaving both leaders

out is because it is unknown whether the followers rated only one leader or both leaders at the same time, thus the average. Additionally, six leaders did not fill in the survey questions about their well-being and were thus excluded from the study as well. This results in a total sample size of 106 leaders.

3.1.2 Measures

The first step for measuring the data is to put all the sample items, which are described in the following sections, into SPSS. Once this is done, a Cronbach's alpha test is run to identify whether there is an internal consistency and reliability between the items. If the result of the test is between 0.7 and 0.9, it implies that there is a reliable consistency between the items and that the scale they form can be used for the study. As the alpha for all the variables is above 0.7, it can be said that there is a sufficient internal consistency and that the data can be used for the study.

In order to also include a more objective data set, the data for job performance and autonomy will be retrieved from the average follower's rating of their leaders. In this way the bias of self-rating can be reduced and a more objective data set is used for this study.

3.1.2.1 Well-being

In the study well-being has been measured once via a shortened version of positive and negative affectivity developed by Watson et al (1988) which was asked in a survey after a team meeting. For the measurement four positive-trait affects, namely "enthusiastic", "inspired", "interested" and "proud", and four negative-trait affects, "upset", "scared", "irritable" and "nervous" have been used ($\alpha = 0.752$). The affects have been measured on a 7-point Likert scale where 1 represents *almost never* and 7 represents *very often*. As there are positive and negative affects, recoding for the negative affects is required before conducting an analysis.

3.1.2.2 Job performance

The data for job performance in this study has been collected by using data from the survey, which was handed out after a team meeting. In this survey the 'followers', which are the team members, rated the leader effectiveness on a 7-point Likert scale reaching from *strongly disagree* to *strongly agree*. For the leader effectiveness the following four items have been used "Leads a group that is effective", "Is effective in meeting my job-related needs", "Is effective in meeting organizational requirements" and "Is effective in representing me to higher authority" ($\alpha = 0.850$), which are based on the multifactor leadership questionnaire developed by Avolio and Bass (1995). The leader effectiveness measurement can be used to measure a leader's job performance because all the four items represent a leader's task and thus measure how well a leader performs his or her job.

3.1.2.3 Autonomy

The autonomy of the non-agile teams has been measured by using a survey after a team meeting and asking four questions about the contingent reward, which is a sub dimension of transactional leadership, within the team. Contingent reward can be defined as "the degree to which the leader sets up constructive transactions or exchanges with followers: the leader clarifies expectations and establishes the rewards for meeting these expectations" (Judge and Piccolo, 2004, p.755). Based on this definition the following 4 items have been used to measure contingent reward "provides me with assistance in exchange for my efforts", "discusses in specific terms who is responsible for achieving performance targets", "makes clear what one can expect to receive when performance goals are achieved" and "expresses confidence when I meet expectations" ($\alpha = 0.947$). According to the cognitive evaluation theory (CET) a high contingent reward implies a low level of autonomy "because the rewards are pressuring and convey that the individual is expected to perform up to the experiment's standards" (Houlfort et al., 2002, p. 282) (Harackiewicz et al., 1984, Deci and Ryan, 2000; Eisenberger et al., 1999). Therefore, the items of contingent reward will be recoded so the variable can be used to predict the level of autonomy.

3.1.3 Data-analysis

After the datasets of the non-agile study have been prepared, analyses are run to identify the relationship between the well-being and the job performance for the study. This is done by conducting a correlation analysis which indicates the strength of the relationship between two variables. In order to be able to run the correlation analysis the mean of all the items of well-being and job performance are used. In a correlation analysis the correlation coefficient *r* varies from -1 to +1: -1 implies a perfect negative correlation, +1 reflects a perfect positive correlation and 0 means no correlation. The outcome indicates whether the linear relationship is perfect (± 1), strong (± 0.7), moderate (± 0.5), weak (± 0.3), or non-existing (0). Additionally, the result of the correlation analysis indicates whether there is a relationship between an individual's well-being, job performance and the team's autonomy level. The outcome of the analysis can then be used for a comparison between agile and non-agile teams which will be discussed in section 4, the cross study comparison.

Additionally, a regression analysis will be conducted for the hypotheses testing. A regression analysis allows the researcher to examine how much of the dependent variable can be explained by the independent variable. For this analysis well-being will be used as an independent variable whereas job performance represents the dependent variable. As aforementioned, it is expected that well-being has a positive influence on job performance. The same analysis is implemented to test the second hypothesis which states that the level of autonomy influences the relationship between well-being and job performance.

3.2 Results

3.2.1 Correlation analysis

Before conducting this analysis, the data need to meet a few requirements. The first requirement is that there are at least two continuous variables. Moreover, there has to be a linear relationship between the variables and, the cases need to be independent and randomly collected from the population. Lastly, there should be no outliers and a normal distribution in the data residuals is assumed. As demonstrated in appendix 9.2 the requirements for conducting a correlation analysis are met.

Table 1: correlation non-agile

Variables		*n*	*M*	*SD*	1	2	3
1.	Well-being	106	5.42	0.54	1		
2.	Job performance	106	5.32	0.56	0.132	1	
3.	Autonomy	106	2.72	0.44	- 0.166	- 0.750**	1

Note: **correlation is significant at the 0.01 level (2-tailed)

For well-being and job performance a positive weak linear relationship has been identified with a value of $r = 0.132$. For both well-being and autonomy and job performance and autonomy a negative linear relationship can be identified with $r = -0.166$, which means a weak negative relationship, and -0.750, indicating a strong negative relationship, respectively. Additionally, the analysis proofs that there is only a statistically significant linear relationship between job performance and autonomy, as the significance level is below 0.01 for only those

two variables. Hence, *Hypothesis 1*, which states a relationship between well-being and job performance, is found not to be true.

3.2.2 Step-wise regression analysis

Next a regression analysis is conducted, which identifies how much of the job performance variable, which is the dependent variable, can be explained by well-being, the independent variable. Before conducting the test the following four conditions need to be checked: no outliers, normality, homoscedasticity and linearity. As demonstrated in the appendix 9.3 the conditions are fulfilled and therefore the analysis can be conducted. As the value of the R^2 is 0.017 (see Table 2) it can be concluded that 1.7% of the value of job performance can be explained by the independent variable well-being. Moreover, as illustrated in Table 2, the standardized beta coefficient shows that there is a non-significant positive relationship between well-being and job performance ($\beta = 0.138$, $p > 0.05$). Hence, not enough evidence was found to support *Hypothesis 1* for the non-agile dataset.

In order to test the second hypothesis of the study, which states that autonomy, the moderator variable, influences the relationship between well-being and job performance, a stepwise regression analysis is conducted to test the moderation effect. With this method, variables will be added one-by-one so that it can be checked how much each independent variable varies in its explanation of the dependent variable each time a new variable is added into the regression equation. As mentioned before, the regression well-being explains 1.7% of job performance. However, when adding autonomy, the R^2 increases to 0.563, which means that together well-being ($\beta = 0.008$, $p > 0.05$) and autonomy ($\beta = -0.954$, $p < 0.01$) explain 56.3% of job performance. Finally, a new variable is computed, by first centering the two independent variables and then multiplying them together. This variable then can be used to test the moderation of autonomy on the correlation between well-being and job performance. When adding the new variable to the regression analysis the R^2 increases even further to 0.578 ($\beta = -0.072$, $p > 0.05$). Indeed, as shown in Table 2, only autonomy is significant while the well-being and the moderator variable are not significant with a p-value above 0.05. Hence, not enough support for *Hypothesis 2* was found for the non-agile dataset.

Table 2: step-wise regression analysis non-agile

	Job performance		
	Step 1	Step 2	Step 3
Well-being	0.138	0.008	- 0.19
Autonomy		- 0.954**	- 0.995**
Moderator			- 0.072
df	105	105	105
R^2	0.017	0.563	0.578
ΔR^2	0.008	0.554	0.565
F	1.851	66.311	46.527

Notes: *p < 0.05; **p < 0.01

4. STUDY 2 – AGILE TEAM

4.1 Methodology

4.1.1 Sampling

Currently the department of Change Management & Organizational Behavior of the University of Twente is working on a project in collaboration with a company that switched to an agile way of working. The aim of the study is to achieve a better understanding of agile teams. Each squad works within a sprint on selected projects for typically about two weeks. Within these two weeks three meetings have been recorded, namely planning (meeting 1), refinement (meeting 2) and retrospective (meeting 3). Additionally, after each of the three meetings a survey has been handed out to all the squad members. The survey was filled in directly after the meetings. In this survey different questions were asked to, inter alia, measure the well-being or the individual performance during the meeting. Lastly, the level of arousal has been measured by using special bracelets which use skin conductance. The sample size for this study consists of 14 squads with up to nine squad members which results in about 100 individuals. However, due to COVID-19 several meetings were cancelled which reduced the sample size to 30 individuals.

Within the sample size there is a 77/23 male-female distribution and the age ranges from 26 to 58 years. Moreover, 47% of the sample size have obtained a Master degree of a University and the average of work experience within and agile environment is 3.6 years. For more detailed information about the sample characteristics see appendix 9.4.

4.1.2 Measures

In the following section the different items used for this study are operationalized and explained.

4.1.2.1 Well-being

The questions about well-being were asked after each of the three meetings. The data for personal well-being was collected by stating 14 different types of feelings which were answered by each individual of the squad. The possible answers reach from *never* to *always* on a 7-point Likert scale. The following behavior traits are measured in the survey with a distinction between positive and negative traits: “inspired”, “alert”, “enthusiastic”, “determined”, “active”, “interested”, “proud” and “attentive” belong to positive affect while “nervous”, “ashamed”, “irritable”, “scared”, “upset” and “afraid” are seen as negative affect (Watson et al, 1988) ($\alpha = 0.837$). As the data of well-being consists of three meetings, only the first two meetings will be used to calculate an average of the well-being. This will be done to decrease the common method bias as much as possible because the job performance and squad autonomy data is taken from the survey after the third meeting. As the different dimensions of the PANAS model are both positive and negative, the negative trait-affects will be recoded whereas 1 represents *always* and 7 represents *never*.

4.1.2.2 Job performance

The data of the performance in this study has been collected in two ways. Firstly, all the squad members filled in a survey after the third meeting, where they rated the performance and secondly, the leaders were rated by their supervisors on the performance. The survey measured four items of performance based on the research of Gibson et al. (2009), which are “I am constantly high performing”, “I am effective”, “I make few mistakes”, “I do high quality work”. A 7-point Likert scale was used anchored at 1 = *strongly disagree* and 7 = *strongly agree*, wherein the scale 1 represents a *very low* performance and 7 represents a *very high* performance.

4.1.2.3 Autonomy

The level of autonomy within a squad in the agile study was measured by a 3-item scale in the survey that was handed out after the third meeting to all the squad members. The three items in the survey, which are based on the study of van Mierlo et al. (2006), are: “this squad has significant autonomy in determining how we do our work”, “this squad can decide on its own how to go about doing our work” and “we, as a squad, have considerable opportunity for independence and freedom in how we do our work” ($\alpha = 0.796$). All items were measured by a 7-point Likert

scale where 1 represents *strongly disagree* and 7 represents *strongly agree*.

4.1.3 Data-analysis

The first step for measuring the data is to put all the sample items into SPSS. Once this is done, a Cronbach's alpha test is run to identify whether there is an internal consistency and reliability between the items. As the alpha of all the variables is above 0.7, it can be said that there is a sufficient internal consistency and that the data can be used for the study.

In order to also include a more objective data set, surveys which have been filled in by a supervisor, so called expert surveys, will be used to compare the mean of job performance. However, due to the very limited amount of data, it is not possible to leave out certain values in case the data used differs significantly from the expert surveys but at the end it can be used to identify certain limitations of the study.

After the datasets of the agile study has been prepared, analyses are run to identify the relationship between the well-being and the job performance for each study. The results of the correlation analysis will indicate whether there is a correlation between an individual's well-being job performance and the autonomy. After that, a regression analysis is run to examine how much of the dependent variable can be explained by the independent variable. Lastly, a moderator analysis is used to identify the moderation effect of autonomy on the correlation between well-being and job performance.

4.2 Results

4.2.1 Correlation analysis

As for the non-agile study, three new variables have been computed to identify a mean number for the different variables. Once this is done for well-being ($\mu = 5.37$; $SD = 0.63$), job performance ($\mu = 5.30$; $SD = 0.79$) and leadership style ($\mu = 5.06$; $SD = 1.14$) a correlation analysis can be conducted to identify the value of the correlation coefficient. While well-being and job performance have a moderate positive relation with a correlation coefficient r of 0.599, both variables are significantly less correlated with the squad autonomy. While well-being and squad autonomy only have a correlation coefficient of 0.018, which indicates no relationship, job performance and squad autonomy have a weak linear relationship with a value of 0.158 for r. Additionally, only the relationship between well-being and job performance is statistically significant with a p-value below 0.01, as shown in Table 3 below.

Table 3: correlation agile

Variables	*n*	*M*	*SD*	1	2	3
1. WELL-BEING	30	5.37	0.63	1		
2. JOB PERFORMANCE	30	5.30	0.79	0.599**	1	
3. AUTONOMY	30	5.06	1.14	0.018	0.158	1

Note: **correlation is significant at the 0.01 level (2-tailed)

3.1.1 Step-wise regression analysis

The regression analysis is used to identify how much of the job performance variable, which is the dependent variable, can be explained by well-being, the independent variable. Before conducting the test the following four conditions need to be checked: no outliers, normality, homoscedasticity and linearity. As demonstrated in appendix 9.5 the conditions are fulfilled and therefore the analysis can be conducted. As the value of the R^2 is 0.359 (see Table 4) it can be concluded that 35.9% of the value of job performance can be explained by the independent variable well-being. Moreover, the standardized beta coefficient shows that there is a positive moderate strength of the effect in the sample ($\beta = 0.479$) which is shown in Table 4. Hence, enough evidence was found to support *Hypothesis 1* for the agile dataset.

Table 4: step-wise regression analysis agile

	Job performance		
	Step 1	Step 2	Step 3
Well-being	0.479**	0.803**	0.790**
Autonomy		- 0.105	- 0.091
Moderator			0.058
df	29	29	29
R^2	0.359	0.382	0.388
ΔR^2	0.336	0.336	0.317
F	15.706	8.336	5.487

Notes: *p < 0.05; **p < 0.01

In order to test the second hypothesis of the study, which states that autonomy, the moderator variable, influences the correlation between well-being and job performance, a stepwise regression analysis is conducted to test the moderation. With this method variables will be added one-by-one and thus it can be checked whether the regression changes with each variable. As mentioned before R^2 of the regression between well-being and job performance is 35.9%. However, when adding squad autonomy, the R^2 increases to 42.3% and the standardized coefficient show that there is a weak negative strength of the effect in the sample ($\beta = - 0.105$), which is not significant ($p > 0.05$). Finally, a new variable is computed, by first centering the two independent variables and then multiplying them together. This variable then can be used to test the moderation of autonomy on the correlation between well-being and job performance. When adding the new variable to the regression analysis the R^2 increases to 44.9%. Moreover, the standardized coefficient shows that there is no strength of the effect of the moderator variable which is additionally not significant ($\beta = 0.058$, $p > 0.05$). Hence not enough evidence is found to support *Hypothesis 2* for the agile dataset.

3.1.2 Expert surveys

Due to COVID-19 situation there was only a limited amount of data available for the agile study. Therefore, the expert survey is used to check whether the employees filled in the surveys correctly and to include a relative object check for the data. In the expert survey, supervisors have filled in a survey where the squad performance was rated on a 7-point Likert scale. When comparing the employee's surveys with the expert surveys it becomes clear that there only is a small difference between the results of both surveys. While the job performance ratings of the employees has a mean of 5.30 and a standard deviation of 0.79, the squad performance rated by the experts has a mean of 5.39 and a standard deviation of 0.76. Thus, it can be concluded that the surveys have been filled in reliably and that the data can be used for the study.

4. CROSS STUDY COMPARISON

4.1 Correlation

The correlation analyses of the non-agile and agile teams show some significant difference. While for the non-agile governmental institution only a weak positive correlation with job performance has been identified, the financial agile organization showed a moderate positive correlation with job

performance. Additionally, only the agile study showed a significant correlation between well-being and job performance with a significance level below 0.001. The correlation between well-being and job performance for the non-agile team has been found to not be significant. Furthermore, in the study of the governmental institution both well-being and job performance are negatively correlated with autonomy, whereas well-being shows a weak correlation and job performance a strong correlation with autonomy. Additionally, only the correlation between job performance and autonomy was found to be significant with a significance level below 0.001. However, the study of the financial institution showed no linear relationship between well-being and autonomy and a weak positive linear relationship between job performance and autonomy. Both correlations were found to no be significant with a significance level above 0.05.

Thus, it can be concluded that in the non-agile study only a significant strong negative linear relationship between job performance and autonomy was found while in the agile study only a significant moderate positive correlation between well-being and job performance has been identified. All the other relationships within both studies were found to not be significant.

4.2 Step-wise regression

The non-agile and agile studies do not only differ from each other in the correlation analysis but also show differences in the regression analyses. While in the non-agile study 1.7% of job performance can be explained by well-being

While in the non-agile study 1.7% of the dependent variable job performance can be explained by well-being, the independent variable, with a beta coefficient of 0.138, 35.9% of job performance in the agile study can be explained by well-being with a statistically significant beta coefficient of 0.479. This shows that not only the regression between the two variables differs in the studies, but also that the strength of the effect in the sample is lower in the non-agile study. Therefore, it can be concluded that only in the agile study *Hypothesis 1* is supported.

The second hypothesis of this study states that autonomy moderates the positive relationship between well-being and job performance which can be tested via a moderation analysis in SPSS. With regard to the study of the governmental institution, when contingent reward (i.e. autonomy) is added, the initial R^2 increases from 1.7% to 56.3%. Moreover, the results show that, there is a moderating effect of autonomy on the relationship between well-being and job performance, which however is not significant. In the financial institution study the regression between well-being and job performance is 35.9%. Then when adding squad autonomy, the R^2 of the regression increases to 38.2%. The R^2 increases even further to 38.8% when the moderator variable is included in the regression equation but does not reach statistical significance Hence, it can be concluded that for both studies a moderating effect of autonomy has been identified but that none of the moderations is statistically significant. Thus, for both studies not enough evidence was found to support *Hypothesis 2*.

4.3 Independent samples t-test

In order to check whether there is a significant difference between the non-agile and agile study, an independent samples t-test is conducted for each variable for which the mean variables of that specific variable is used. If the significance level is below 0.05 a significant difference can be assumed. As demonstrated in appendix 9.7 all requirements, except for the approximately normal distribution of the variable autonomy, for the independent samples t-test are fulfilled and therefore with considering the unmet requirement the test can be conducted.

Before conducting the independent samples t-test, null hypotheses are set up as follows for all the variables in this thesis, namely well-being, job performance and autonomy:

H(0): μ (non-agile) – μ (agile) = 0 ("the difference of the means is equal to zero)

where μ (non-agile) and μ (agile) are the population means for the governmental and financial institution, respectively.

The test is then conducted by testing the null hypothesis, which states that the means of the two groups are equal. If the p-value of the test is below the significance level $\alpha = 0.05$ the null hypothesis can be rejected, and it can be concluded that there is a significant difference between the study of the governmental and financial organization. As shown Table 5 the difference between autonomy is significantly different for the two studies while the difference in the well-being and job performance variable is not significantly different from each other. Moreover, for job performance and autonomy equal variances have been assumed based on the Levene's test (p-value < 0.05) while for well-being equal variance could not be assumed based on the Levene's test (p = 0.157).

Table 5: Independent samples t-test non-agile and agile

	Non-agile		*Agile*		*t(134)*	*p*
	M	*SD*	*M*	*SD*		
Well-being	5.41	0.54	5.37	0.63	- 0.376	0.709
Job Performance	5.32	0.60	5.30	0.79	- 0.150	0.881
Autonomy	2.72	0.44	5.06	1.14	17.215	0.000

5. DISCUSSION

This research aimed at answering the following research question: *How does the different level of autonomy in agile and non-agile teams impact the potential relationship between individual worker's well-being and job performance?*

On the basis of this research several things can be concluded. First of all, no significant correlation between well-being and job performance has been found for the non-agile study while for the agile study a significant positive relationship was found. Hence, *Hypothesis 1*, was supported for the agile study but not for the non-agile study. Additionally, for both studies not enough evidence was found to support *Hypothesis 2*.

5.1 Theoretical implications

Indeed, the results of the agile team are in line with the happy-productive theory, which in a nutshell posits that if the employees score high on well-being the job performance improves (Wright et al., 2007). As an organizations goal is to gain a high profit, it is essential to increase job performance (Moe et al., 2010) which can be done by increasing employee well-being. Thus, it is crucial for organizations, adopting an agile management, to ensure a good working environment (Danna and Griffin, 1999; Bliese et al., 2017), which may promote to an increase in well-being and thus improve the overall job performance. Even though only limited research on the impact well-being has on job performance is available, this paper supports the importance of creating a good working environment within agile teams in order to enhance job performance.

As discussed before the non-agile team was found to not have a significant correlation between well-being and job performance. This could be explained by the fact that the non-agile team was represented by a strong bureaucratic institution. The idea of bureaucracy was developed by Max Weber (1947) and is characterized by division of labor, clear authority hierarchy, formal selection procedures, detailed rules and regulations as well as impersonal relationships. The bureaucratic way of organizing an institution can be connected to the Theory X, developed by Douglas McGregor (1960), which states that people generally dislike work and that they need controlling and directions in order to perform the work. If this is the case for the non-agile teams it makes sense that the happy productive theory is less relevant as the teams have strict rules and regulations on how to perform their tasks.

Moreover, for both the non-agile and agile study the level of autonomy was found to not have a significant impact on the correlation between well-being and job performance. The 'substitute for leadership' theory states that autonomy is one factor that can influence an individual's performance and effectiveness (Kerr and Jermier, 1978). Indeed, this also has been shown in the non-agile study where autonomy showed a strong negative influence on job performance. This finding is supported by the self-determination theory, which states that individuals are in need for autonomy. According to Ryan (1995) and Deci et al. (2017) a high level of autonomy can enhance the effectiveness and performance of individuals. However, according to Lee and Edmondson (2017) it can be very complex within self-managing teams to achieve effective interdependent work without a managerial authority within the team. So far only little is known about the effects of eliminating managerial authority completely from a team as this will mean that there is no one to solve problems in case of e.g. arguments or disagreements. Thus, a right balance within the autonomy level is required in order to achieve an effective and high performing team.

Lastly, the t-test showed that there is a significant difference between the autonomy level of the non-agile and agile team. As explained earlier agile teams do not have one leader anymore but instead works as a self-managing team (Birkinshaw, 2018). Thus, agile teams are supposed to have a higher level of autonomy than non-agile teams (Tessem, 2014). This aspect has been supported by the t-test where the non-agile team was proven to have a significant lower level of autonomy than the agile team.

5.2 Practical implications

Nowadays, more and more organizations are seeking to rearrange the organization towards less hierarchy (Lee and Edmondson, 2017). In order to do this in a successful way and to enhance the performance of employees several aspects need to be considered. First of all, it is important to improve employee's well-being. In this study it was found that well-being has a moderate positive correlation on job performance within agile teams. This means the higher the well-being of an individual, the higher the job performance will be. Therefore, it is advised for managers, who lead an agile organization or who consider switching to an agile way of working, to create a good working environment where employees feel comfortable. This can be achieved by enhancing communication within the organization, listen to employees' ideas as well as recognizing hard work (Clements-Croome, 2006). Additionally, managers should aim at reducing stress, anxiety and nervousness to increase the workplace happiness and thus the employees' well-being. This can for example be done by organizing workshops about well-being and mindfulness where the employees are taught how to take care about their own well-being.

For non-agile, very bureaucratic organizations, job performance can be improved by increasing the level of autonomy (Deci et al., 2017). This can be done by controlling the employees less on the standard and simple tasks they have to do. In this way the employees feel less controlled by their managers and perceive more freedom in performing their tasks. However, this is not advised to do with complex and new tasks as this could easily overwhelm the employees as they are not used to a high level of autonomy.

5.3 Limitation and future research

This research has several limitations which should be taken into consideration when further researching on this topic in the future. Firstly, the data set of the agile study had a significantly lower number of participants than the non-agile data set. The main reason for this is that the non-agile study has already been completed while the agile study is still ongoing. However, due to the COVID-19 situation, it was not possible to collect further data since March. Thus, if a more complete data set of the agile study had been available, the results might have been more reliable and generalizable. Hence, for future research it would be interesting to see whether the results change when conducting the same analyses with a bigger or complete dataset.

Another limitation of this research is the way job performance and autonomy has been measured. While in the survey of the agile study specific items were available to test the autonomy level, in the non-agile study a proxy variable had to be created to measure job performance and autonomy. This was due to the fact that autonomy was not a key factor to be explored in a non-agile environment. This means that there could be some bias in the way autonomy has been measured, which might have influenced the results of this research. Therefore, future research interested in comparing agile and non-agile management could think of collecting primary data also on autonomy in non-agile settings in order to allow for a rigorous and robust comparison.

Additionally, for this thesis for the agile study only subjective survey data has been used, which could be argued is less reliable than objective data. There is a chance that employees did not fill in the data correctly and that in this way the research has been harmed. In the non-agile study it was possible to reduce this potential bias by using the ratings of the employees for the data of the leaders. Therefore, when conducting future research, it is advised to also include more objective data in the study, at least for variables, such as job performance, that allow for alternative ratings than self-reported data.

Moreover, the data has been collected from multiple individuals belonging to the same group which means that the data are nested. Due to this condition, the key assumptions of regression analysis might not have been met. Although from our screening, except for the homoscedasticity requirement, this does not seem the case for this study. However, beta coefficients and their level of significance should still be interpreted carefully. Especially for the agile data where the data is retrieved from three different meetings there is risk for nested data.

An additional possible limitation of this study is that the organizations used for both studies differ from each other. While the non-agile organization was represented by a governmental, non-profit institute, the data of the agile study was retrieved from a profit firm. This might have caused biases as a non-profit organization might have other aims than a profit organization.

Lastly, for future research it would be interesting to investigate further the difference between agile and non-agile teams in relation to other factors similar to autonomy. Especially when more and more organizations are changing towards an agile way

of working, it is essential to get more clarifications on the impact different factors can have on the performance.

6. CONCLUSION

In the process of answering the research question a distinction in two main parts has been made. Firstly, the relationship between well-being and job performance has been analyzed and secondly the moderating effect of autonomy on this relationship has been tested. The relationship between well-being and job performance was found to be positive and significant for only the agile teams. Therefore, it can be concluded that there is a positive linear relationship between well-being and job performance in organizations that adapted to an agile way of working. The second part, the moderating effect of autonomy, was found to not be significant for both studies. However, a significant effect of autonomy has been identified in the non-agile study which indicated that the level of autonomy has to some extent an effect on job performance.

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First of all, I would like to thank my two supervisors Desiree van Dun and Lara Carminati for the support during this Bachelor thesis. In the last month I constantly received useful feedback and advice on how to improve my work. I feel that I could not have succeeded in this way without my supervisors' help and that I learned a lot from their feedback. I really enjoyed working on this project and I feel like this is a nice way to end my Bachelor studies at the University of Twente.

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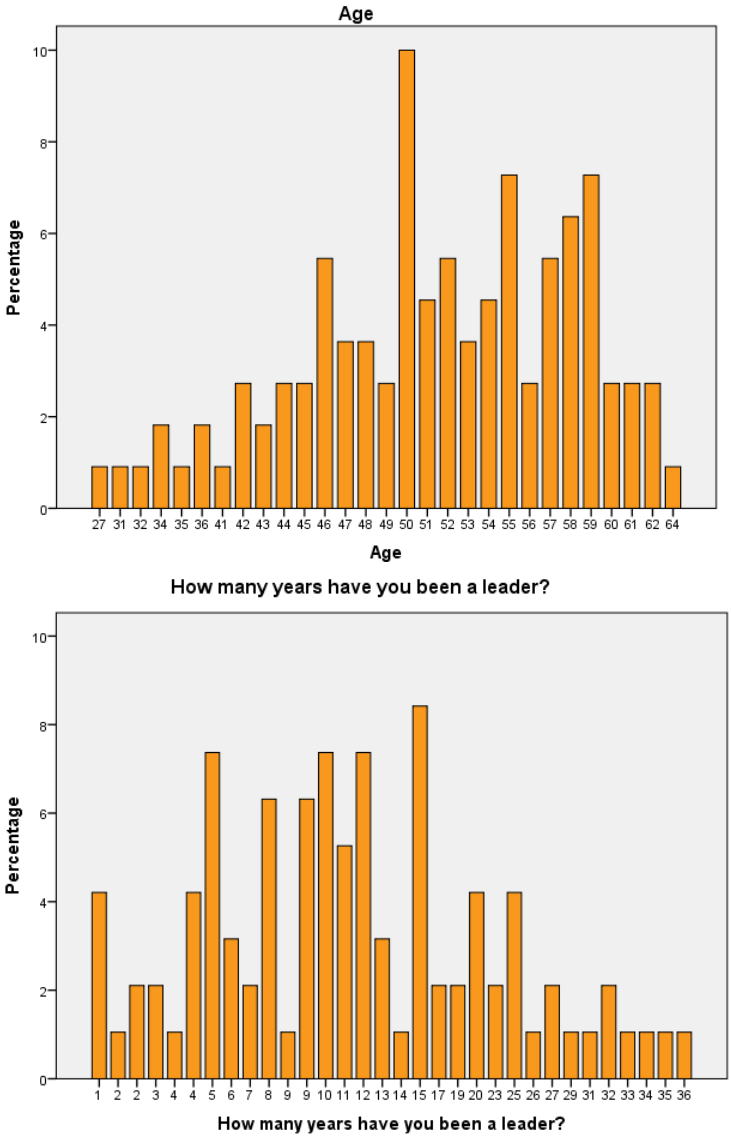
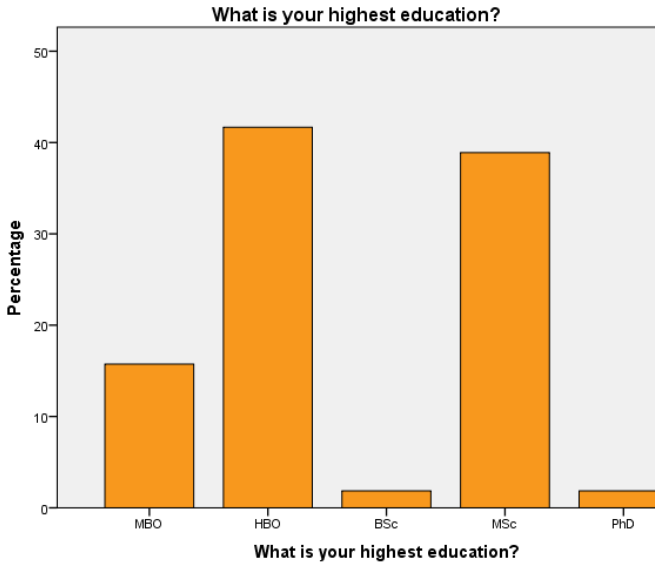
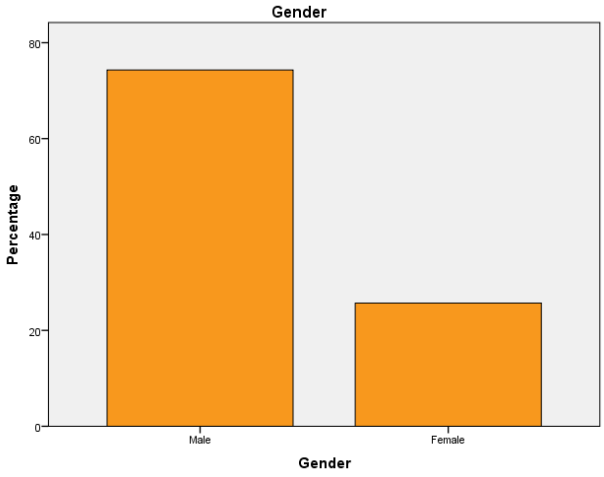
9. APPENDIX

9.1 Sample characteristics non-agile

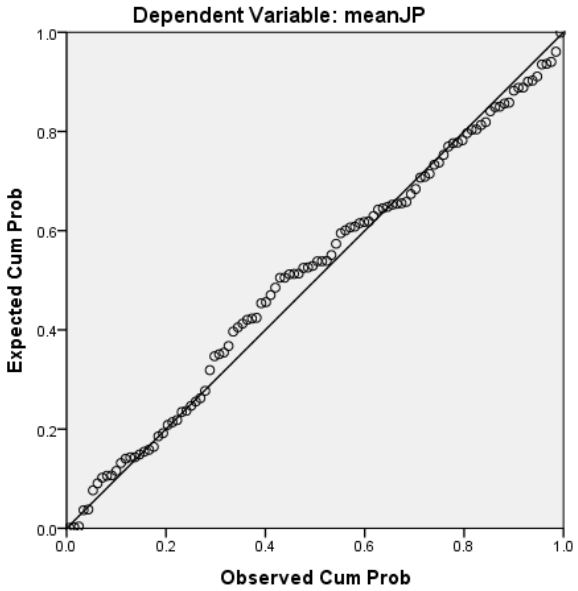






9.2 Requirements correlation analysis non-agile

The first requirement for conducting a correlation analysis is that there are at least two continuous variables. This requirement is met for this analysis as well-being, job performance and autonomy are all used as continuous variables. Additionally, it is required that the cases are selected independently and randomly from the population. As the study was conducted within a company by which all employees were able to participate this requirement is met. Another requirement is that there should be a linear relationship between the variables. As shown below in the graph this requirement is met as the dots are close to the line.



Lastly, a normal distribution in the data residuals is assumed for conducting the analysis. This assumption is made based on the fact that the skewness of the variables is between -0.5 and 0.5 which indicates an approximately symmetric model.

9.3 Requirements regression analysis non-agile

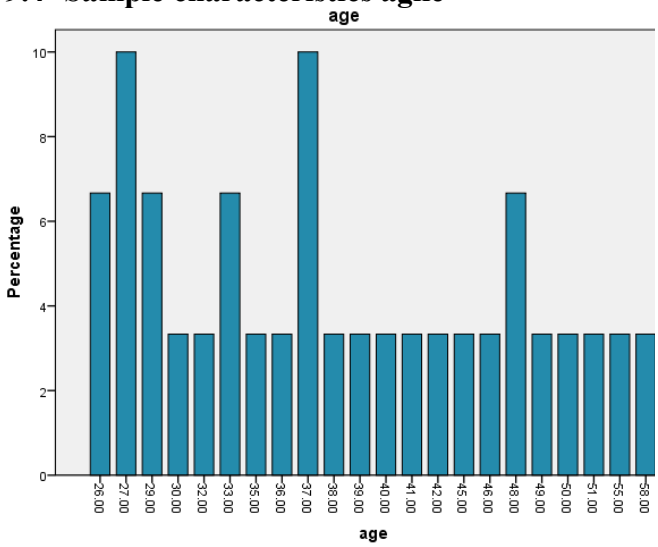
The first condition, no outliers, can be tested by checking the standard residuals. If the value of the standard residuals is not in between ± 3 it means that there are too many outliers and that the regression analysis cannot be conducted. For the non-agile data the standard residual value is between -1.158 and 1.183 which means that there are not too many outliers to use the test. Thus, the first requirement is met.

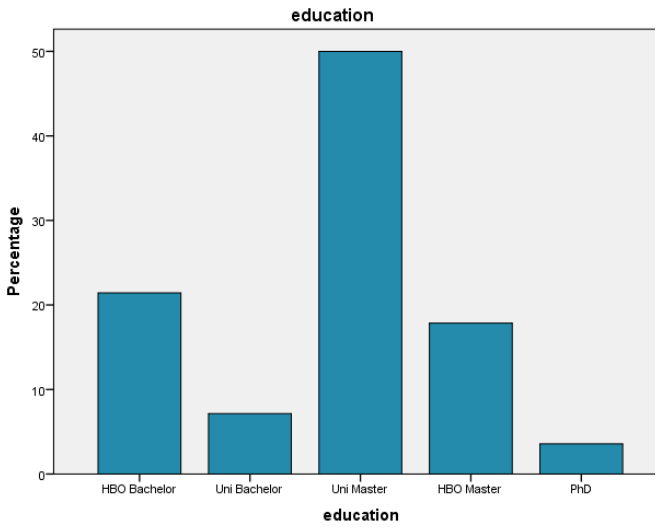
The second requirement, the normality, has already been shown in the previous subsection based on the level of skewness which was between -0.5 and 0.5 and thus a symmetric distribution is assumed.

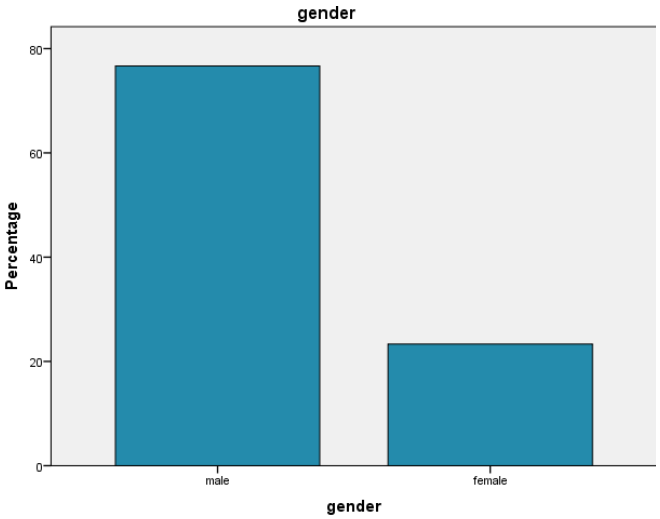
Similarly the requirement of linearity has already been analyzed in the previous subsection. As the graph shows that the dots are rather close to the line it indicates that there is a linear relationship between the variables.

Lastly, the requirement for homoscedasticity has to be tested. This will be done by calculating the ratio of the largest sample variance to the smallest sample variance. If the ratio does not exceed 1.5 the requirement of homoscedasticity is satisfied. The largest sample variance is 0.313 and the smallest variance is 0.193 which results in a ratio of 1.62. This means that the requirement of homoscedasticity is not met. However, as the ratio is still close to 1.5 the analysis will still be conducted with keeping in mind the unmet requirement.

9.4 Sample characteristics agile

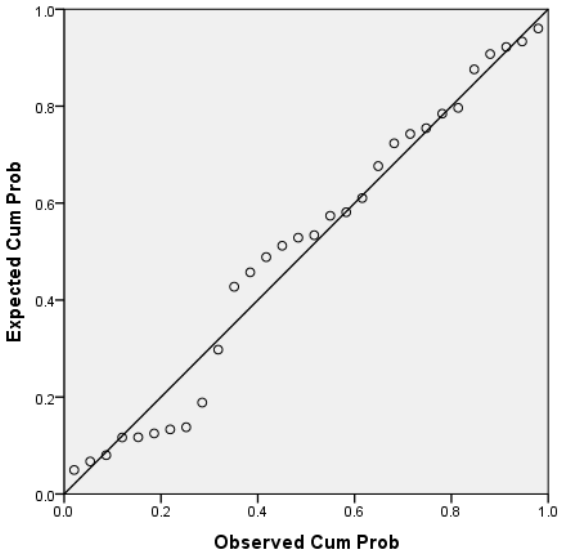






9.5 Requirements correlation analysis agile

The first requirement for conducting a correlation analysis is that there are at least two continuous variables. This requirement is met for this analysis as well-being, job performance and autonomy are all used as continuous variables. Additionally, it is required that the cases are selected independently and randomly from the population. As the study was conducted within a company by which all employees were able to participate this requirement is met. Another requirement is that there should be a linear relationship between the variables. As shown below in the graph this requirement is not fully met as the dots are not very close to the line. However, this might be explained by the small sample size. Therefore, not too much emphasize will be put on this requirement as the small sample size will be considered within the limitations of this study already.



Lastly, a normal distribution in the data residuals is assumed for conducting the analysis. This assumption is made based on the fact that the skewness of the variables is between -0.5 and 0.5 which indicates an approximately symmetric model.

9.6 Conditions regression analysis agile

The first condition, no outliers, can be tested by checking the standard residuals. If the value of the standard residuals is not in between ± 3 it means that there are too many outliers and that the regression analysis cannot be conducted. For the agile data set

the standard residual value is between -1.650 and 1.753 which means that there are not too many outliers to use the test.

The second requirement, the normality, has already been shown in the previous subsection based on the level of skewness which was between -0.5 and 0.5 and thus a symmetric distribution is assumed.

Similarly the requirement of linearity has already been analyzed in the previous subsection. Even though the graph does not show a linearity the test will be conducted anyhow as the non-linearity might be caused by the small sample size which already is mentioned as a limitation of this study.

Lastly, the requirement for homoscedasticity has to be tested. This will be done by calculating the ratio of the largest sample variance to the smallest sample variance. If the ratio does not exceed 1.5 the requirement of homoscedasticity is satisfied. The largest sample variance is 1.296 and the smallest variance is 0.402 which results in a ratio of 3.224. This means that the requirement of homoscedasticity is not met. However, as the ratio is still rather close to 1.5 the analysis will still be conducted with keeping in mind the unmet requirement.

9.7 Requirements independent samples t-test

In order to conduct an independent samples t-test the data must meet certain requirements which need to be fulfilled. Firstly, the dependent variable must be continuous, e.g. interval or ratio level, while the independent variable needs to be categorical. This requirement is for both, the non-agile and agile study, met. The independent variable has two groups, either the employee is from the non-agile or agile study. Furthermore, all the dependent variables, well-being, job performance and autonomy are measured in a continuous way. Secondly, both groups need to be independent from each other. This means that if someone is part of the non-agile group that individual cannot be part of the agile group. Thus, members of one group cannot influence members in the other group and therefore the groups are not influenced by each other. As the samples are only taken from employees of the individual companies it can be assumed that the samples are independent from each other. Lastly, an approximately normal distribution for each dependent variable is required. For both well-being and job performance the skewness is between -0.5 and 0.5 (see Table 6), which indicates an approximately symmetric distribution. However, for autonomy the skewness is 0.831 which means that the distribution is moderately positive skewed. This needs to be taken into consideration when interpreting that t-test of the autonomy variable.

Table 6: descriptive statistics

	N	*Mean*	*Std. Deviation*	Skewness		Kurtosis	
	Statistic	*Statistic*	*Statistic*	Statistic	Std. Error	Statistic	Std. Error
WB	136	5.09	0.69	- 0.193	0.066	0.298	0.133
JP	136	4.94	0.99	- 0.469	0.066	- 0.008	0.133
AUT	1357	2.78	0.95	0.831	0.066	0.993	0.133

Thus, except from the normal distribution of the autonomy variable all the requirements of the independent samples t-test are met.