Emotional Intelligence and Job Performance in Agile Teams

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ABSTRACT
'Agile' is a relatively new organisational approach to establish highly autonomous, self-managing teams. Originating from the world of software development, the agile approach is now increasingly and successfully being adopted by other sectors as well. As opposed to more hierarchical, traditional approaches to teamwork, agile team members are expected to interact frequently and intensively with different stakeholders. With agile teams being highly people and teamwork oriented, emotions play an important role in the success and performance of the individual agile team member. By employing a unique combination of survey and video-observed data, this thesis aims to explore the relationship between emotional intelligence and job performance of agile team members. Video observed coding of 17 agile team meetings, linear regression analyses and hypothesis testing were performed on a maximum sample size of 50 agile team members in a large Dutch commercial organisation. Results show a moderately positive relationship between self-rated emotional intelligence and job performance. A secondary aim of this thesis was achieved by providing practical recommendations to improve the recently developed observed emotional intelligence codebook by van Gorp (2018).

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1. INTRODUCTION

Teams can work together in many ways, and the agile way of working, or 'agile', is one of those. Agile is a relatively new, unconventional way for a team to work on projects. Very different from that of traditional project teamwork, agile teams are self-managing; one of the differences when one compares agile to traditional project team management is the distribution of responsibility (Fernandez, 2008). Additionally, agile is seen to be specifically useful for projects that are time constrained, complex and uncertain (Williams, 2005). Although primarily used in software development, companies outside that domain have adopted agile as well, with success (Conforto et al., 2014). According to Fernandez (2008), agile can be described as a thought process that includes the following practices:

1. *Think small incremental deliverables*

2. *Get the customer to have some skin in the game*

3. *Never have a breakage – have continuous Q&A at every point through assurance process*

4. *State up front requirements are fluid – build the process around fluid requirements*

(Fernandez, 2008, p.11)

The agile way of working revolves around scrum, which is a process in which the agile team incrementally delivers a product or service in several sprints lasting around four weeks (Rising & Janoff, 2000). The context of this research is set in a large commercial organization in The Netherlands which has been working with the agile 'scrum' process since 2015. Agile teams at this organization have three meeting moments during each sprint which this thesis will refer to as the Kick-off, Progress and Reflection meeting. According to "*The Scrum Guide*" by Sutherland and Schwaber (2017) the sprint Kick-off serves to decide what work will be done during the sprint and Progress meeting serves the purpose of "(…) adding detail, estimates, and order to items in the Product Backlog" (p.15). The sprint Reflection serves as a reflection moment on what happened during the sprint to improve future sprints (Dybå et al., 2014). These meetings and the practice of continuous Q&A show the importance of interaction in agile. Research empathizing the importance of this interaction was done by Conboy et al. (2011); in comparing agile to more traditional methods of teamwork, he found agile to be highly people and teamwork oriented. In a software development team, all members are responsible for the end product and through shared mental models, they must develop an understanding of how to complete tasks and the task itself (Levesque et al., 2001). Adriyani et al. (2017) found that discussing feelings, amongst other aspects, is an important activity during Reflection meetings. Melnik and Maurer (2004) point out that in agile teamwork, knowledge is a social construct and collectively held, and verbal communication is important to transfer ideas, concepts and desires. However, without empathy and communication skills, knowledge transfer in agile teams may become difficult (Takpuie and Tanner 2016). Given that agile requires teams to be self-managing in time-constrained, complex, and uncertain situations, it becomes evident that individual emotions play an important role in such a setting. For example, Thorgren and Caiman (2019) empathize the role of psychological safety in stimulating interaction in agile teams. Still, psychological concepts in an agile context have received little attention so far. One concept that has gone alongside the study of emotions during the last decades is emotional intelligence. Emotional intelligence is shown to be related to improved communication (Ciarrochi and Mayer, 2013) and even job performance, as shown later in this thesis. Given their self-managing nature and the importance of the people-factor in agile teams, a better understanding of the role of emotional intelligence could enhance our understanding of what drives agile team performance. Much research has been devoted to how we can best measure emotional intelligence. Although most measurements of emotional intelligence based on self-ratings, more recently observational and other-rated measurement methods were developed. By focussing on self-rated *and* observed emotional intelligence, this thesis firstly aims to enhance our understanding of an individuals' emotional intelligence in relation to the individuals' job performance in an agile team. In doing so, this thesis aims to answer the following research question: *How does self-rated emotional intelligence relate to job performance as compared to observed emotional intelligence of agile team members?*

A second aim of this thesis is to provide an in-depth analysis of emotional intelligence and job performance as both self-rated and observed (objective) constructs in an agile context. Additionally, this thesis makes use of both self-rated (surveyed) and observational (filmed) measurement, which is a unique when it comes to measurement of emotional intelligence and job performance. Therefore, this thesis also seeks to improve methodological understanding of how emotional intelligence and job performance can be assessed.

Research on EI in an agile team setting is present, but few publications exist. This research provides theoretical relevance by generating an increased understanding of the role of emotional intelligence (on job performance) in agile teams. Subsequent practical relevance can for example be created by providing increased awareness to emotions during sprint meetings such as the Reflection meetings.

2. THEORETICAL FRAMEWORK

2.1 Emotional intelligence

There is more than just the ability to reason, solve mathematical problems or insight problems (intellectual or cognitive intelligence). Salovey & Mayer (1990) introduced Emotional Intelligence (EI) as new entrant into the field of social intelligence, which was defined as early as 1920 as "the ability to perceive one's own and others' internal states, motives, and behaviours, and to act toward them optimally on the basis of that information" (Thorndike, 1920; Salovey & Mayer, 1990, p.435). Salovey & Mayer (1990) introduced EI as a subset of social intelligence, which is neurologically distinguishable just like intellectual intelligence as shown by Bar-On et al. (2003). They showed that "(…) patients with lesions in the somatic marker circuitry revealed significantly low emotional intelligence and poor judgment in decision-making as well as disturbances in social functioning, in spite of normal levels of cognitive intelligence (IQ)" (Bar-On et al., 2003, p.1). Findings like these show a clear, even

physiological, distinction between cognitive intelligence and emotional (or social) intelligence. Development of the EI concept resulted in the popularization of EI in popular, management and psychology literature. During this growth spurt, which took place in the 1990's, the popularization of EI is illustrated by authors like Daniel Goleman in his book "*Emotional Intelligence: Why it can matter more than IQ*" (1995). Another example is the appearance of EI on the front cover of TIME magazine in October 1995, with the accompanying caption "It's not your IQ. It's not even a number. But emotional intelligence may be the best predictor of success in life, redefining what it means to be smart" (TIME, cover page). Overall, these statements were provided with little empirical support (Ciarrochi, Joseph & Chan, Amy & Caputi, Peter, 2000)

It is important to acknowledge that the conceptualization of EI split into two general directions. One direction conceptualizes EI as mix of general mental abilities or positive traits, also known as trait based EI (Mayer et al., 2000). A second direction provides us a definition of EI as 'ability-based' (Mayer & Salovey, 1997; Mayer et al., 2000), and it is this definition that has gained most scientific backing through for example the study of Van Rooy and Viswesvaran (2004), which found an observed validity of .33 between an ability-based EI scale and general mental ability versus a validity of only .09 when using a trait-based EI scale for predicting general mental ability.

The conceptualization of ability-based EI started with Salovey and Mayer's (1990) definition of EI as "the subset of social intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions" (p.189). In their first work on EI, Salovey and Mayer (1990) introduced three distinct dimensions that make up EI: 'regulation of emotion', 'utilization of emotion' and 'appraisal and expression of emotion'. Later, the same authors further defined EI as (1) "the ability to perceive emotions", (2) "to access and generate emotions so as to assist thought", (3) "to understand emotions and emotional meanings", and lastly, (4) "to reflectively regulate emotions so as to promote both better emotion and thought" (Mayer & Salovey, 1997, p.5). Davies et al. (1998) labelled these four distinct dimensions as emotion perception, regulation, understanding, and utilization. Joseph and Newman (2010) further proposed a cascading model for ability-based EI, suggesting that emotion perception causally precedes emotion understanding, which then influences conscious emotion regulation and job performance. Emotion facilitation is not included in their model due to empirical redundancy with the other dimensions and lack of empirical support.

When it comes to comparing ability and trait-based EI, the introduction of this section already mentioned the increased predictive validity of ability-based EI over trait-based EI when it comes to predicting general mental abilities. Additionally, Mayer et al. (2008) provide a strong recommendation for ability-based EI as opposed to trait-based EI, stating that trait-based EI tends be overly broad in definition. From the observation that EI is concretely distinguishable from other abilities, as shown by Bar-On et. al. (2003), it is understandable to stick to a strict definition of EI as the one introduced by Mayer and Salovey (1997).

In this research we use the ability-based model of EI, not just because the test population was measured using an ability-based scale, but also because this narrower definition of EI allow us to make distinctions between EI and other general mental abilities.

2.2 Linking EI and employee job performance

Some authors even went so far as to making the claim that EI is linked to performance (Goleman, 1995). For example, Goleman (1998) states "for star performance in all jobs, in every field, emotional competence is twice as important as purely cognitive abilities" (p.34). Although tempting, one must be careful when linking EI to job performance or success. For example, the type of EI measure chosen influences the predictive value of EI on job performance, as illustrated by Joseph and Newman (2010) who added personality traits and cognitive ability as moderating variables. Joseph and Newman (2010) found; "At best, only mixed models of EI show substantial incremental validity over cognitive ability and Big 5 personality traits. At worst, measures of ability models of EI show only a modicum of incremental validity over cognitive ability and personality traits (…)" (p. 69). Their results showed large differences in predictive validity between EI measurement types.

In 2004, Zeidner et al. state the link between EI and performance has not been researched much, although some evidence exists based on anecdotes, case studies and surveys. However, since then several scientific researches have been presented by for example Farh et al. (2012) and Wilderom et al. (2015). Farh et al. (2012) examined the role of ability based EI in improving teamwork effectiveness and subsequently job performance, and found positive results when accounting for personality, cognitive ability, emotional labour job demands, job complexity, and demographic control variables. Wilderom et al. (2015) investigated the role of EI of store managers and store performance, and found an indirect link where emotionally intelligent store managers impact group cohesiveness, which then influences sales-directed behaviour and ultimately, store performance.

Additionally, in focusing on the EI dimension of emotion regulation in linking EI to job performance, Joseph and Newman (2010) posit that emotional regulation of positive emotions can be theoretically linked to job performance, because "(…) emotion regulation is the tool through which we create and maintain positive affective states, which have been suggested to benefit work" (Joseph and Newman, 2010, p. 56). Joseph and Newman (2010) finally provide evidence that EI is a predictor for job performance, albeit only for emotionally demanding jobs.

As illustrated by the aforementioned research, context is an important factor in the impact of ability based EI on job performance. Job performance is only related to EI when emotional labour, or the emotional sensitivity required to do the job, is significant (Joseph & Newman, 2010). Kluemper et al. (2013) replicated the study of Joseph and Newman (2010), finding a link between emotion regulation (or in their words, EMA; Emotion Management Ability) as dimension

of ability based EI and job performance, stepping away from linking ability EI as a whole to job performance. Kluemper et al. (2013) also found emotion regulation to be a predictor of job performance in emotionally demanding jobs only, finding emotion regulation to be even a stronger predictor than general mental abilities and Big Five personality traits. Additionally, the role of emotions in social performative relationships, like decision making and team performance, is shown to require a high level of emotional intelligence (Antonakis et al., 2009). Luca and Tarricone (2001) and Yost and Tucker (2000) investigated the role of EI in a team setting and emphasize the role of interpersonal relationships as an important element for successful teams. In their study on the effects of leader and follower EI on performance and attitude and the first application of the WLEIS scale, Wong and Law (2002) also found the relationship between job performance and EI to be moderated by emotional labour in addition to job satisfaction.

Concerning EI in agile teams, few publications exist which translate the role of both emotional intelligence and performance to the agile team member level. Given the self-managing nature of agile teams, it is possible to from draw from research by Paik et al. (2019), which found that members with high EI levels were found to be better at teamwork and assuming an informal leadership role in self-managing teams. EI was also found to be a good (future) indicator of a team members' performance in self-managing teams (Paik et al., 2019). A case study by Soltani et al. (2018) suggests that social mechanisms related to EI contribute to agile team member performance in daily meetings and Reflective meetings. Luong et. al (2019) show that all four dimensions of ability based EI are related to communication challenges in agile teams. In the same research, they also found mutual trust to be related to the ability of emotion perception and regulation. These studies are in line with research that suggests employees could be selected based on EI alongside traditional measures (Hendon et al., 2017) and studies that suggest employees can also be trained on EI to improve their performance (Mattingly and Kraiger, 2019).

To see whether EI as a whole and the EI dimension 'regulating emotions' does indeed influence job performance of agile team members, the following hypotheses are tested in this research:

Hypothesis 1: There is a positive relationship between self-rated emotional intelligence and self-rated job performance of agile team members.

Hypothesis 2: There is a positive relationship between regulating emotions as dimension of self-rated emotional intelligence and self-rated job performance of agile team members.

2.3 Measuring EI and Job performance

Several scales have been developed which are said to measure ability-based EI. Hereafter, the following three measurement methods will be distinguished: self-rated EI scales, multi-rater or 360 degree measures of EI, and observed EI.

One of the most popular scales for measuring ability based EI is the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) V2.0 (Mayer, Salovey, Caruso & Sitarenios, 2003), which lets respondents solve emotion related tasks and problems based on the four dimensions of EI developed by the same authors (Mayer & Salovey, 1997). Another measure of ability based EI that has proven its worth in research and application according to Siegling et al. (2015) is the Workgroup Emotional Intelligence Profile, Version 3 (WEIP-3) introduced by Jordan et al (2002), which was designed specifically to profile the emotional intelligence of individuals in work teams. WEIP-3 was applied to study the link between EI and two performance-based factors on the team level: team process effectiveness and team goal focus. A more recent measurement set of ability based EI scales are Situational Test of Emotional Understanding (STEU) and Management (STEM) introduced by MacCann and Roberts (2008). These measures are used to assess emotion understanding and management, both elements being part of the four dimensions introduced by Salovey and Mayer (2000). The population of this research has been tested using the Wong & Law Emotional Intelligence Scale, or WLEIS (Wong & Law, 2002). This is a proper scale to use in this context because it was specifically designed as an ability-based EI scale for workplace settings (Siegling et al., 2015).

The EI measures mentioned so far (MSCEIT, WEIP-3, STEU, STEM and WLEIS) are all self-rated scales can therefore be classified as measuring typical performance ability based EI. There are limitations to self-reported measures of EI: they are more likely to reflect perceived rather than actual EI performance (Davies, Stankov, & Roberts, 1998; Paulhus, Lysy, & Yik, 1998) and they can be faked (Day & Carroll, 2007; Grubb & McDaniel, 2007). In his book "*Mood and Temperament"*, Watson (2000) provides the main issue with ability based EI being subjectivity of emotional experience.

The issues associated with self-rated EI measurement can be partly mitigated by employing the multi-rater or 360-degree measure of EI as introduced by Bar-On and Handley (2003), which combines both self-report and measurement by others. Findings by Palmer and Stough (2005) show that ability based EI can reliably be measured by others and that a rater "(…) does not need insight into EI or indeed perhaps actual EI in order to provide a valid perception of how they perceive someone else's emotionally intelligent behaviour in the workplace." (Palmer and Stough, 2005, p.2). Given that multiple raters can improve the measurement of EI by mitigating the limitations of self-rated EI, it becomes interesting to investigate observed EI. Observed EI has been scantly researched. However, a scale was recently developed by van Gorp (2018) which distinguishes verbal emotionally intelligent behaviours and provides a measurement of said behaviours. Strict observation may tackle the subjectivity of emotion perception in self-rated EI assessment and is therefore an inviting measurement method for this research. Further advantages of video observation are brought forward by Waller & Kaplan (2018) stating that video observation brings forward more enlightening conclusions than traditional data such as surveys. This is unsurprising as video data 'illuminate' (inter)actions that are difficult to discern from survey data (Christianson, 2018). Given that observed EI has the potential to better asses a persons' level of emotional intelligence over self-rated EI, this research will

include observed EI as predictor for job performance. The following hypotheses are therefore tested:

Hypothesis 3: There is a positive relationship between observed emotional intelligence and self-rated job performance of agile team members.

Hypothesis 4: There is a positive relationship between regulating emotions as dimension of observed emotional intelligence and self-rated job performance of agile team members.

The limiting factors brought by self-rated data, as seen with self-rated EI (i.e fakeability and subjectivity) apply to the dependent variable of job performance as well. Job performance measures done by others (supervisors or peers) are most prevalent (Viswesvaran et al., 1996). Although those measures step away from self-ratings, those measures show issues as well. For example, a high proportion of variance in job performance ratings can be assigned to raters themselves, a phenomenon that can be attributed to rater bias (O'Neill et al., 2015). Pransky et al. (2006) suggest that both self-rated and more objective (other) rated job performance measures may be necessary to capture all aspects of job performance accurately. During this research, job performance of all subjects was also rated by *independent* scorers, and a second dependent variable, complementary to self-rated job performance, was established: other-rated job performance. In doing so, subjectivity and rater bias issues associated with traditional job performance measures (like self and peer-rated) may be circumvented. The analyses and hypotheses established to measure how self-rated job performance is influenced by EI will therefore be applied to other-rated job performance as well, resulting in hypotheses 5-8 as follows:

Hypothesis 5: There is a positive relationship between self-rated emotional intelligence and other-rated job performance of agile team members.

Hypothesis 6: There is a positive relationship between regulating emotions as dimension of survey-rated emotional intelligence and other-rated job performance of agile team members.

Hypothesis 7: There is a positive relationship between observed emotional intelligence and other-rated job performance of agile team members.

Hypothesis 8: There is a positive relationship between regulating emotions as dimension of observed emotional intelligence and other-rated job performance of agile team members.

3. METHODOLOGY

3.1 Research design

This is a mixed-method field study of agile team members which makes use of surveys, video observation and expert ratings. Data from 65 team members of eight agile work teams are used to explore whether there is a relationship between emotional intelligence and job performance in an agile context. Given this context and the self-managing nature of agile teams, this study is in line with recent calls for new and focussed research on organizations that step away from less hierarchical structures (Lee and Edmondson, 2017; Velinov et al., 2018; Martela, 2019). Although the concepts of EI and job performance are well established, research on the relationship between the two in an *agile* context is nascent. The small sample size analysed in this thesis is therefore justified by the explorative rather than formal predictive aim of establishing what the relationship is between EI and job performance.

The relationship between EI and job performance is explored using regression analyses and hypothesis testing. Furthermore, the observed emotional intelligence coding scheme of Van Gorp (2018) is used and analysed to explore whether it indeed measures what it is supposed to. Video-based data is also used by having scorers rate job performance of team members using a scale by Gibson et. al (2019), which is then applied to complement the dependent variable of job performance.

Software used includes The Observer XT, which is a tool to track and record the EI behaviours during the video recorded meetings, and IBM SPSS Statistics, which is a program used to conduct the regression analyses and gather descriptive data.

3.2 Sampling procedure and sample characteristics

As part of a larger context research, data was gathered and processed by the department of Change Management & Organizational Behaviour (CMOB) from the University of Twente. A unique feature of this research is the application of video-observed data, which was used to generate the variables observed EI and other-rated job performance. The participating organization and all participating agile team members provided written consent to being filmed during three team meetings. Three cameras were used to film each meeting and each team member wore a tag to ease identification during coding. Before and after the meetings, survey data (including that for EI and job performance) was collected from the team members. Persons coding the video data signed confidentiality agreements to protect privacy and company specific information.

Video and survey data were gathered over the Kick-off, Progress, and Reflection meetings which were carried out by each agile team during one sprint. The EI survey was taken after the Kick-off meeting whereas the job performance survey was taken after the Reflective meeting. Other-rated job performance was rated by independent observers after the meetings had taken place. A total of 17 meetings were observed, which averaged 51 minutes in duration. On average, most team members agreed or slightly agreed that their meeting was effective. Each agile work teams consisted of five to ten people. Average age of the team members is 39 years with ages ranging from 22 to 65. Male/female distribution was 76% and 24%, respectively. Most teams were multicultural, with 64% of the sample claiming Dutch as their most fluent language. Other languages spoken vary substantially. All except one team member provided an education level higher than high school, with 64.4% claiming a university-level education or higher.

3.3 Measures

This thesis contains emotional intelligence (EI) as independent variable. This variable is sub-divided into self-rated emotional intelligence (as a whole and just the

dimension of emotion regulation) and observed emotional intelligence. The dependent variable is (other-rated) job performance.

3.3.1. Self-rated EI. Measurement of self-rated EI is based on the 16-item WLEIS scale (Wong and Law, 2002). This scale (Appendix A) includes the four dimensions of ability based EI as follows: Self Emotional Appraisal (SEA), Others' Emotional Appraisal (OEA), Regulation of Emotion (ROE), and Use of Emotion (UOE) (Siegling et. al, 2015). Each dimension consists of four items based on a Likert scale ranging from 1 to 7, whereby the subject is asked to what extent he or she agrees with the statement. Cronbach's alpha for the complete EI scale is .83, showing internal consistency. Each of the four sub-dimensions scored a Cronbach's alpha of .69, .82, .78 and .79, respectively.

3.3.2. Observed EI. Measurement of observed EI will be done using video observation and coding using van Gorp's (2018) EI codebook. The codebook includes observed behaviours of the four EI dimensions: expressing emotions, utilizing emotions, understanding emotions, and regulating emotions (van Gorp, 2018). Using Observer XT, the frequency of behaviours related to the four dimensions can be recorded. These behaviours will nearly always be verbal. To prevent observer bias, coding is done in pairs by two trained and independent observers, who first code independently from each other before comparing results. A Kappa value was recorded before comparing each observed meeting. Kappa values were very low on average (0.37), which was attributable to both raters only recording frequency of observed EI behaviours, and not duration. This issue was resolved by having both raters independently assign timeframes to each coded behaviour, after which they resolved inconsistencies in a single video coded 'golden' file. A final observed EI score per subject was calculated by averaging the standardized frequencies of each behaviour over all three meetings. The observed EI subdimension 'regulating emotions' is calculated using the codes 'Moderating emotions' and 'Mentioning the influence of expressing emotions'.

3.3.3. Self-rated job performance. Measurement of job performance is based on the four-item survey by Gibson et al. (2009) with the items as seen in Appendix A. Note that like the WLEIS scale, these survey questions were mixed in between other concepts, which is done to prevent survey non-response (Sakshaug et al., 2019). This scale is derived from a larger set of measurements by Gibson which included four survey items on team performance. For this study, these four items were rephrased to reflect individual performance using a Likert scale ranging from 1 to 7, whereby each subject is asked to what extent he or she agrees with the statement. A final job performance score for each subject was calculated by adding the scores of each questionnaire item and averaging it. Cronbach's Alpha for this scale is .83, showing the scale is internally consistent.

4.3.4. Other-rated job performance. Lastly, each agile team member was rated based on the Gibson et al. (2009) scale by an average of four independent scorers. In this case, the scorers used a scale ranging from 1 to 10. The scorers were selected based on whether they had done video-coding or transcribing for the specific team they were asked to rate. Each rater had experience with the team members they were asked to rate based on approximately 2.5 hours of video observation and coding or transcribing. Therefore, the raters were able to make a reliable estimation of team members' performance, especially considering the fact the raters knew each team member and could therefore make relative performance comparisons. All raters have higher education levels in the form of University level BSc or MSc degrees. Intra-class correlation (ICC) was used as a measure for inter-rater reliability (IRR) (Hallgren, 2012). A mean, two-way mixed, consistency, average-measures ICC score of .58 over all raters indicates moderate agreement among raters when rating job performance.

3.4 Data analysis

Before any analyses were carried out, observational data was transferred from Observer XT to SPSS. In SPSS, 'missing' values were assigned to subject-variable combinations that were not present during certain meetings.

Reliability of the van Gorp (2018) observed EI scale is tested by comparing the results of video observed EI to the validated WLEIS scale in the same subject. To do so, a standardized observed EI value is created per subject by averaging the frequency of observed EI behaviours over the amount of time the subject was observed. Using correlational analysis in SPSS, a relationship between the standardized observed EI variable and the non-standardized WLEIS score can be established. To examine whether emotionally intelligent behaviour differs per meeting, mean values for observed EI over the three observed meetings will be gathered and analysed. Specifically, this allows for an analysis whether the Reflective meeting shows more observable emotionally intelligent behaviour due to the reflective nature of the meeting, as suggested by Adriyani et al. (2017). Consistency of the observed EI variable is analysed by using a paired samples t-test in SPSS. Any subject which missed a meeting is left out of the analysis.

Using simple linear regression in SPSS, Pearson correlation coefficients will be calculated to illustrate possible relationships between the variables shown in **Table 1**.

Table 1. Variables used in correlation analyses (Pearson's *r*) & hypothesis testing

Hypothesis	Independent variable	Dependent variable
1.	EI (self-rated)	Job performance
2.	EI (self-rated, only regulating emotions)	Job performance
3.	EI (observed)	Job performance
4.	EI (observed, only regulating emotions)	Job performance
5.	EI (self-rated)	Job performance (other-rated)
6.	EI (self-rated, only regulating emotions)	Job performance (other-rated)
7.	EI (observed)	Job performance (other-rated)
8.	EI (observed, only regulating emotions)	Job performance (other-rated)

Homoscedasticity and normal distribution of the residual error terms are checked as prerequisite distributional requirements (Habeck & Brickman, 2018; Ernst & Albers, 2017). Pearson's *r* correlation interpretation is based on thresholds by Evans (1996), with less than 0.20 being very weak, 0.20 to 0.39 weak, 0.40 to 0.59 moderate, 0.60 to 0.79 strong and 0.80 or greater being a very strong correlation. Once regression analyses are done, the hypotheses provided in Section 2.2 and 2.3 are tested using a significance level of 0.05.

4. RESULTS

4.1 Descriptive statistics

Before regression analyses were carried out, descriptive statistics including realized sample size per variable and tests for normality were generated using SPSS. A summary table of the variables used is shown in **Table 2**. Not all variables received an equal sample size due to some surveys not being filled in by all agile team members. Also, two of out of eight teams were not observed due to technical issues and were left out of the (regression) analyses using observational variables.

Table 2. Variables used in hypothesis testing

	Scale range	Normally distributed?	α**
Self-rated EI	1 – 7	Yes	.83
Observed EI	-	No	-
Self-rated EI (regulating emotions)	1 – 7	Yes	.82
Observed EI (regulating emotions	-	No	-
Job performance	1 – 7	Yes	.83
Job performance (other-rated)	1 – 10	Yes	-

Also, a Harman's single-factor test was performed to check for pervasiveness of common method bias among the items of the job performance and EI surveys. Common method bias is not found to be an issue as first factor variance is 26%, where a variance of more than 50% is seen as problematic (Podsakoff & Organ, 1986).

4.1.1 Emotional intelligence (self-rated)

Mean self-rating of team members' EI was 5.42; sub dimensions showed similar scores. In terms of the EI sub-dimensions, mean scores show an average of 5.58 for Self-emotions Appraisal, 5.21 for Regulation of Emotions, 5.60 for Use of Emotion and 5.28 for Others-Emotion Appraisal. The distribution of self-rated EI is normally distributed with a skewness of .16 (SE = 0.30) and kurtosis of -.152 (SE = 0.59). The EI subdimension 'regulating emotions' is near-normally distributed with a skewness of -.564 (SE = 0.297) and kurtosis of .68 (SE = 0.586), with a Shapiro-Wilk test showing W(65) = 0.96, p = 0.04 (p > 0.05 required for normality).

4.1.2 Emotional intelligence (observed)

A total of 583 observed EI behaviours were coded over the course of 17 meetings conducted by six teams (N=50). An overview of how the observations are distributed over the codes and dimensions can be found in Appendix B. Of all but one team the Kick-off, Progress and Reflective meeting were observed, with one team having a faulty recording of its Progress meeting. The distribution of these scores is non-normal with a skewness of 1.07 (SE = 0.34) and kurtosis of .78 (SE = 0.66), with a Shapiro-Wilk test showing W(50) = 0.91, p = 0.01 (p > 0.05 required for normality).

An average value (per-team and over all members) of observed EI was calculated (**Table 3**). For four out of six teams observed, the Reflection meeting resulted in a higher frequency of observed behaviour when compared to the Kick-off and Progress meetings.

Table 3. Averaged observed EI score, per team and all agile team members. N = no. of team members

Team/ Meeting*	1	3	4	6	7	12	**All**
1	1.35	1.27	2.28	0.43	1.99	0.44	**1.29**
N	*9*	*8*	*7*	*6*	*8*	*9*	*47*
2	-	1.43	2.89	0.12	1.17	1.57	**1.42**
N		*7*	*6*	*6*	*4*	*9*	*33*
3	3.30	1.10	3.06	1.04	2.31	0.12	**1.71**
N	*8*	*8*	*5*	*6*	*6*	*9*	*42*

*1 = Kick-off 2= Progress 3= Reflection

Further analysis over the whole sample using a paired samples t-test shows that there was a significant average difference between Kick-off and Reflection scores (t39 = -2.39, p = 0.02). No significant average differences were found between Kick-off-Progress and Progress-Reflection.

4.1.3 Job performance (self-rated)

The items of the four-item job performance scale by Gibson et al. (2009) as seen in Appendix A was filled in by 54 team members and resulted in a mean score of 5.26. The distribution of the final job performance scores per subject is normally distributed with a skewness of -.250 (SE=0.33) and kurtosis of -.269 (SE=0.64), with a Shapiro-Wilk test showing W(54) = 0.98, p=0.63 (p>0.05 required for normality).

4.1.4 Job performance (other-rated)

The same job performance scale items as seen in Appendix A (with a 1-10 scale instead of a 7-point Likert scale) was applied to rate the job performance of all team members. Other-rated job performance shows a mean score of 6.3 with N = 49. A normal distribution is shown with a skewness of -.294 and kurtosis of .979, with a Shapiro-Wilk test showing W(49) = 0.98, p = 0.60 (p > 0.05 required for normality).

4.2 Comparison Observed and Self-rated EI

Bivariate comparison between the final observed EI score and survey EI score per subject (N = 48) shows that the distribution of observed EI scores is non-normally distributed with a skewness of 1.03 (SE = 0.34) and kurtosis of 0.66 (SE = 0.67), whereas the distribution of the EI self-rated score is normally distributed with a skewness of 0.16 (SE = 0.34) and kurtosis of -0.37 (SE = 0.67).

To establish whether the self-rated EI scores and observational EI scores are correlated, e.g 'a subject with a high survey EI score typically scores a high observational EI score', correlational analysis is carried out with SPSS. With one variable having a non-normal distribution, a Spearman's correlation test seems appropriate (as opposed to Pearson's r). However, with the central limit theorem providing an exception to the assumption of normality for Pearson's r, both correlational measures are provided. With Pearson's $r(48) = .014$, p=.462 and Spearman's $r_s(48) = -.073$, p=.311, survey EI and observed EI scores show no correlation.

4.3 Regression Analyses and Hypotheses Testing

An overview of the correlation results can be found in **Table 4**. **Table 5** and **Table 6** provide results for the regression analyses on self-rated job performance and other rated job performance, respectively.

Hypothesis 1. Self-rated EI and self-rated job performance were found to be moderately correlated with $r(48) = .47$, $p<0.001$. This result is statistically significant with β = .47 and adjusted $R^2 = .21$ (F (1,48) = 13.7, p = 0.001). *Hypothesis 1* is not rejected: there is a (moderately) positive relationship between self-rated EI and self-rated job performance.

Hypothesis 2. Very weak correlation was found between regulating emotions and job performance with $r(48) = .172$, $p = .117$. The relationship is not significant with β = .17 and $R^2 = .03$ (F (1,48) = 1.46, $p = .117$). *Hypothesis 2* is rejected; there is no positive relationship between regulating emotions (self-rated) and job performance (self-rated).

Hypothesis 3. Very weak to no correlation was found between observed EI and self-rated job performance with $r(40) = .04$, $p = .41$. The relationship is not significant with β = -.04 and $R^2 = -.02$ (F (1,40) = 0.06, $p = .41$). *Hypothesis 3* is rejected; there is no positive relationship between observed emotional intelligence and job performance (self-rated).

Hypothesis 4. As for the subdimension 'regulating emotions', the results for r and R^2 were the same as the hypothesis test for *Hypothesis 3* (F (1,40) = 0.051, $p = .41$). With $r(40) = .04$, $p = .41$ and β = .04., *Hypothesis 4* is rejected; there is no positive relationship between observed EI (regulating emotions) and self-rated job performance is rejected.

Hypothesis 5. No correlation was found between self-rated EI and other-rated job performance with $r(46) = -.09$, p = .28. The relationship is not significant with R^2=.007 and β = -.09 (F (1,46) = .336, $p = .28$). *Hypothesis 5* is rejected; there is no positive relationship between self-rated emotional intelligence and job performance (other-rated).

Hypothesis 6. Very weak correlation was found between self-rated EI (regulating emotions) and other-rated job performance with $r(46) = .06$, $p = .34$. The relationship is not significant with $R^2 = .004$ and β = .06 (F (1,46) = .167, p = .34). *Hypothesis 6* is rejected; there is no positive relationship between self-rated emotional intelligence (regulating emotions) and job performance (other-rated).

Hypothesis 7. Very weak correlation was found between observed EI and other-rated job performance with $r(47)$ = .16, $p = .14$. The relationship is not significant with R^2= .025 and β = .16 (F (1,47) = 1.23, p = .14). *Hypothesis 7* is rejected; there is no positive relationship between observed emotional intelligence and job performance (other-rated).

Hypothesis 8. Weak correlation was found between observed EI (regulating emotions) and other-rated job performance with $r(47) = .22$, p = .06. The relationship is not significant with R^2 =. 05 and β = .22 (F (1,47) = 2.49, p = .06). *Hypothesis 8* is rejected with a significance level of .05 and accepted with a significance level of .10; there is a (weak) positive relationship between observed emotional intelligence (regulating emotions) and job performance (other-rated).

Table 4. Correlations among variables (Pearson's r)

		n	M	SD	1	2	3	4	5	6
1	Self-rated EI	65	5.42	.58	1					
2	Self-rated EI (RoE)	65	.16	.13	.66*	1				
3	Observed EI	50	5.21	.90	.02	.09	1			
4	Observed EI (RoE)	50	.23	.25	.06	.09	.82*	1		
5	Self-rated Job Performance	54	5.26	.86	.47*	.17	-.04	.04	1	
6	Other rated Job Performance	49	6.3	.98	-.09	.06	.16	.22	-.1	1

Note: RoE = Regulating of Emotions *p < 0.05 (one-tailed)

.

Table 5. Regression analysis summary for predicting *Self-rated Job Performance*

Variable	*B*	95% CI (LL, UL)		β	R^2	*t*	*p*
Self-rated EI	.683	.313	1.053	.47	.21	3.707	.000
Self-rated EI (RoE)	.155	-.103	.413	.17	.03	1.207	.12
Observed EI	-.230	-2.178	1.717	-.04	.02	-.239	.41
Observed EI (RoE)	.114	-.903	1.131	.04	.02	.227	.41

Note. LL and UL indicate lower and upper limits of confidence interval, respectively. RoE indicates Regulating of Emotions

Table 6. Regression analysis summary for predicting *Other-rated Job Performance*

Variable	*B*	95% CI (LL, UL)		β	R^2	*t*	*p*
Self-rated EI	-.140	-.627	.346	-.09	.01	-.580	.28
Self-rated EI (RoE)	.071	-.277	.418	.06	.00	.409	.34
Observed EI	1.258	-1.024	3.539	.16	.03	1.109	.14
Observed EI (RoE)	.874	-.240	1.989	.22	.05	1.579	.06

Note. LL and UL indicate lower and upper limits of confidence interval, respectively. RoE indicates Regulating of Emotions

5. DISCUSSION

This thesis sought to provide an answer to the research question; '*How does self-rated emotional intelligence relate to job performance as compared to observed emotional intelligence of agile team members?*' To answer this question, a total of eight hypotheses were tested using mixed methods which included both dependent and independent variables as self-rated and observed (or 'other-rated') measures.

The results of this thesis show a significant relationship between EI is and job performance. This was found between self-rated EI and self-rated job performance, with a moderate correlation found between self-rated EI and self-rated job performance. Therefore, the only hypothesis supported is *Hypothesis 1*: there is a positive relationship between self-rated emotional intelligence and self-rated job performance of agile team members. Research by Kluemper et al. (2013) found a link between the EI dimension of regulating emotions and job performance, but no significant correlation is found in this thesis, as no statistical backing was found for *Hypothesis 2*, *4*, and *6*. For *Hypothesis 8* however, a marginally significant relationship was found. Furthermore, for *Hypothesis 3*, *5* and *7*, no significant relationships were found.

5.1 Theoretical implications

The results do not imply the link between EI and job performance is non-existent. This thesis adds to previous findings by for example Farh et al. (2012), Wilderom et al. (2015) and Joseph and Newman (2010) which find an (in)direct link between EI and performance. The findings of this thesis are especially in line with those of Luong et al. (2019), which confirmed that self-rated EI as measured by the WLEIS scale is significantly related to individual and team performance related aspects in *agile* context. Thus, this thesis adds to the research progress made since 2004 when Zeidner et al. observed an over-reliance on primarily anecdotal evidence concerning the EI-job performance link. An underlying explanation for the relationship between emotional intelligence and job performance can be found in the Job Demands-Resources (JD-R) model by Demerouti et al. (2001). The JD-R states how a balance between (negative) job demands, like emotional demands and work pressure, and (positive) job resources like autonomy and emotional competencies can lead to *any* positive or negative outcome. As the model is not restricted to specific job demands or resources, it is very flexible and can be applied to the agile setting. In applying the model to the (agile) context of this thesis, job demands are for example found in high performance and emotional demands, whereas job resources are found in team member autonomy, an innovative climate, and emotional competencies (EI). A balance between these factors leads to individual (job) performance outcomes

It is also important to acknowledge the high emotional labour context within agile teams as a possible moderator (Wong and Law, 2002; Joseph and Newman, 2010; Kluemper et al., 2013). For example, team members are expected to interact frequently with multiple stakeholders and amongst themselves in a self-managing context. The self-managing aspect of agile teams should not be underestimated; previous studies have illustrated a positive relationship between EI and team member performance in a self-managing (and agile) team context (Paik et al.,2019; Luong et al., 2019). These findings indicate that agile team members are not only required to possess 'hard skills' as a prerequisite for effective performance but also soft skills. Griffith and Hoppner (2013) found the highest performing employees in an organization to possess not only hard skills as opposed to soft skills, but a *mix of both*. These studies suggest that the link between EI and individual job performance may not be directly visible, but they strongly

suggest an implicit connection. Given this importance of emotional labour in (self-managing) agile teams, the relationship between EI and agile team member performance could potentially be stronger than in other contexts.

The correlation between observed EI (regulating emotions) and other-rated job performance is shown to be marginally significant. This result does seem to suggest there is role for the EI dimension of regulating emotions in predicting (at least) a perceived agile team member performance. However, given its marginal significance, further research is required to understand where we can attribute this relationship to.

The distribution of observed EI behaviours over the Kick-off, Progress and Reflection meetings shows an emphasis on the Reflection. This result supports the finding by Adriyani et al. (2017) which states that an important aspect of the Reflection meeting is the discussion of feelings.

The practice of video observation in addition to survey data has added a rich 'third perspective' source of data. The use of video observation methods is unique in scientific research, mainly because researchers are often unable to overcome barriers associated with video observation. These challenges are mostly inaccessibility and technical issues (Waller & Kaplan, 2018). In this thesis, the practices of video observation and coding has resulted in specific recommendations to improve (video coded) measurement of observed EI and other-rated job performance. Although no significant correlations were found between the scores of observed emotional intelligence and self-rated emotional intelligence, this does not imply that one of either method does not measure emotional intelligence adequately. A possible explanation for this discrepancy is likely to be found in contextual factors, e.g certain agile team members not having an equal opportunity to display (non)verbal emotions as compared to others in the meeting. Further elaboration and recommendations to the improvement of the observed EI codebook can be found in Section 5.3.

5.2 Recommendations for practice

The results of this thesis support the recommendation that agile team members should not only be selected based on their technical skill. They should also be assessed based on their EI levels, which is in line with previous studies by for example Hendon et al. (2017), which advocates that employees should be selected based on EI and communication competence along with hard skills. Especially organisations contemplating setting up self-managing teams or dismantling hierarchical structures would benefit from increased awareness towards the importance of EI. These organisations could subsequently include EI in their selection criteria. Additionally, recent findings have shown EI can indeed be trained (e.g. Mattingly and Kraiger, 2019). Therefore, it is important to treat EI as an ability that can be improved upon in both selection and training practices. On the agile team level, room should be given to not only discuss technical project related matters, but also emotions and feelings experienced by agile team members. Specifically, the Reflection meeting serves as an important moment to reflect and discuss feelings related to the agile teamwork.

5.3 Limitations and future research recommendations

A maximum of 50 subjects per analysis resulted in this thesis having a limited sample size. Data collection was severely hindered from March 2020 onwards by the Covid-19 pandemic. Although several more teams could have potentially been added to the sample, it is questionable whether the survey and observed results for EI and job performance would have been significantly different if the sample size were to be larger. Instead of a larger sample size from the same closed context organization, it would have been better to draw survey and observed measures from multiple contexts and to examine whether differences in results are related to contextual factors. An important contextual factor for this research was the self-managing nature of agile teams. Likewise, agile teams show a flat hierarchical structure. For future research, this research could be replicated to multiple organisational contexts with differing levels of hierarchy and/or self-management. Another important contextual factor related to agile teams is the level of emotional labour. Required levels of emotional labour in a team or organisation are likely related to the required mix of soft and hard skills. Future research concerning the importance of EI in an organisation and/or team could take in account different levels of hard skills over soft skills required to perform a job.

Both EI as measured by the WLEIS scale and job performance are self-report measures, which are subject to response bias. Prior research on measurement of ability based EI show promising results towards rated-by-others measurement methods such as the observed EI scale. However, observed EI was shown to have its limitations as well, as such it requires further validation and improvement. Of specific interest to the improvement of the codebook is the literature review by Christianson (2018), which maps several studies on video observation of emotions and (team) interaction. Based on coding experience from this research, the following improvements are suggested related to the use of the observed EI codebook:

1. Include non-verbal emotional behaviours, such as laughter, visible anger, or sadness under existing codes/categories.
2. Include more examples to ease the coding process, e.g under B.3 add 'Recalling an event or phase and the emotions experienced during said event/phase.' Under C.1 add: 'Someone saying 'I understand (…)' or 'You mean (…)' in response to someone else mentioning feelings/emotions.
3. Consider including weights to specific behaviours, e.g to someone initiating a specific emotion (like laughing/joking) that is picked up by others (contagion effect). Specific consideration should be given to providing a higher weight to the subdimension 'regulating emotions' given its importance in predicting job performance in previous research (e.g Joseph and Newman, 2010).

A further limitation that became clear during the coding process was the fact that during the meetings, the extent to which subjects spoke and showed (non)verbal behaviour was unevenly distributed. Especially the team product owner spoke frequently, but an uneven distribution of (non)verbal behaviour was seen amongst regular team members as well. Given the fact that the observed EI codebook relies on frequency of shown emotions, this could result in some subjects receiving significantly high or low scores, regardless of their actual EI levels. A possible solution to this issue could be to observe subjects in a context where each subject has an equal opportunity to display (non)verbal emotional behaviour. Lastly, it is recommended to employ video-observation of EI alongside other measures, such as self-rated and/or other rated survey measures. A truly 'three dimensional' measurement of EI would include self- and other (survey) ratings and an observed rating. Such measure could also account for potential biases such as common method bias.

For future research, more objective job performance data could improve reliability of results. Although in this research job performance was also rated by independent observers, true job performance is likely better reflected in quantifiable (output) measures or ratings by peers and supervisors. These were not available for this sample. For the other-rated job performance variable applied in this thesis, a moderate agreement (ICC) among raters was found. For future research, it is recommended to improve this measure of IRR by providing clear instructions to raters on how to apply the scale and how to rate subjects based on the survey items. A job performance measurement that includes self and multiple other and peer-ratings is preferred. Subsequently, an analysis of interrater reliability should be carried out to assess whether actual job performance and its dimensions are measured (Viswesvaran et al., 1996)

As a last note regarding the relationship between observed emotional intelligence (regulating emotions) and other-rated job performance, further research is recommended. This research could specifically focus on whether the relationship can be attributed to raters' perception of team members' performance and observable traits related to emotional intelligence.

Postscript

Given the found emphasis of observed emotional intelligence on the last of three meetings observed (the Reflection), a 'last minute' analysis was done to find whether a relationship exists between an observed EI score derived from this meeting and (other rated) job performance. However, no statistically significant correlation was found between 'ObsEI_Meeting3' and job performance with r(37) = -.03, p = .44. Also, no statistically significant correlation was found between 'ObsEI_Meeting3' and other-rated job performance with r(37) = .01, p = .27.

5.4 Conclusion

The results of this thesis show a statistically significant correlation between (self-rated) EI and job performance in the individual agile team member. The role of EI in agile teams should not be underestimated. Organisations practicing the agile approach are advised to take in account EI in selection and training practices and Scrum meetings, specifically meetings which are reflective in nature. Video observed coding of emotional intelligence through the recently developed observed EI codebook by van Gorp (2018) brought to light several practical recommendations for improvement of the codebook. These improvements include the addition of non-verbal behaviour, inclusion of more examples and the consideration to add weights to specific scores. Future study and application of the improved codebook on larger samples in different contexts is advised to make conclusive improvements of the observed EI measure. These improvements have valuable potential as video-based coding and rating of emotional intelligence and job performance already brought forward useful findings in this thesis, such the increased presence of emotionally intelligent behaviour in reflective meetings. Thus, a methodological contribution of thesis is shown in the significant potential observed measures have in enhancing our understanding of dynamics and outcomes in the individual and (agile) team level

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7. APPENDIXES

7.1 Appendix A – Items of WLEIS and Job Performance Scales

ITEMS WONG & LAW EMOTIONAL INTELLIGENCE SCALE

1. I have a good sense of why I have certain feelings most of the time.
2. I have good understanding of my own emotions.
3. I really understand what I feel.
4. I always know whether or not I am happy.
5. I always know my friends' emotions from their behavior.
6. I am a good observer of others' emotions.
7. I am sensitive to the feelings and emotions of others.
8. I have good understanding of the emotions of people around me.
9. I always set goals for myself and then try my best to achieve them.
10. I always tell myself I am a competent person.
11. I am a self-motivated person.
12. I would always encourage myself to try my best.
13. I am able to control my temper and handle difficulties rationally.
14. I am quite capable of controlling my own emotions.
15. I can always calm down quickly when I am very angry.
16. I have good control of my own emotions.

Notes:

Scales: SEA = 1–4; OEA = 5–8; ROE = 9–12; UOE = 13–16.

JOB PERFORMANCE SCALE ITEMS BASED ON GIBSON ET AL. (2009)

1. I am consistently high performing
2. I am effective
3. I make few mistakes
4. I do high quality work

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7.2 Appendix B

Observed Emotional Intelligence codebook frequencies over sprint meetings

	Kick-off	%	Progress	%	Reflection	%	All meetings	%
Expressing emotions (dimension total)	**112**	**64.0%**	**124**	**64.2%**	**101**	**47.0%**	**337**	**57.8%**
Expressing emotions	109	62.3%	122	63.2%	93	43.3%	324	55.6%
Expressing related needs			1	0.5%	2	0.9%	3	0.5%
Empathizing	3	1.7%	1	0.5%	6	2.8%	10	1.7%
Utilizing emotions (dimension total	**12**	**6.9%**	**8**	**4.1%**	**37**	**17.2%**	**57**	**9.8%**
Preventing negative emotions	9	5.1%	7	3.6%	8	3.7%	24	4.1%
Considering multiple points of view	1	0.6%			8	3.7%	9	1.5%
Expressing emotional memories	2	1.1%	1	0.5%	21	9.8%	24	4.1%
Understanding emotions (dimension total)	**2**	**1.1%**	**4**	**2.1%**	**16**	**7.4%**	**22**	**3.8%**
Expressing an understanding of complex emotions					2	0.9%	2	0.3%
Expressing the meaning that emotions may convey			1	0.5%			1	0.2%
Interpreting the degree of accuracy of emotions					4	1.9%	4	0.7%
Describing how emotions evolve over time	2	1.1%	3	1.6%	10	4.7%	15	2.6%
Regulating emotions (dimension total)	**49**	**28.0%**	**57**	**29.5%**	**61**	**28.4%**	**167**	**28.6%**
Mentioning the influence of expressing emotions	1	0.6%	2	1.0%	2	0.9%	5	0.9%
Moderating emotions	48	27.4%	55	28.5%	59	27.4%	162	27.8%
Total	**175**	**100%**	**193**	**100%**	**215**	**100%**	**583**	**100.0%**