Thesis Grades in the Graduate School of Psychology

University of Amsterdam

Background Information

Situation

The Graduate School of Psychology at the University of Amsterdam requires students to obtain a certain number of credits (ECs) in order to graduate. Students obtain these credits from compulsory and elective courses, internships and the Master's thesis (18 EC). The master's thesis constitutes a significant portion of the ECs obtained, impacting the students' final grades. Recently, there has been an interest in determining which courses can maximise the chances of obtaining a good grade on the thesis. Students are able to choose different combinations of courses, programs and modules within and outside (with approval) of the School of Psychology. Students are also allowed to extend their studies to a maximum of 2.5 years for a 1 year Master program. While the choices offered by the Psychology department increases flexibility for the student, the variability causes an inherent difficulty in identifying the common factors that underpin a successful thesis submission.

Objective

Our primary objective for this project is to examine if the grade received on the Master's thesis is linked to specific courses taken within the Graduate School of Psychology as well as Bachelor learning courses. The Bachelor learning courses of interest include: (1) Pract.Onderzoek & Rapp., (2) Propedeusethese TST, and (3) Wetensch. & Stat. Redeneren T. We are specifically interested in students who have graduated within the department of Psychology.

As secondary objects, we will also investigate if specific Master tracks, course durations and the number of ECs obtained also influence students' thesis grades.

Data wrangling

Initially we were given 3 datasets: (1) a long format results spreadsheet of grades on Bachelor/Master courses, and (2) a wide format graduation spreadsheet showing just psychology graduates (those we are interested in), and (3) details of student specialisations. After reshaping (1) to a wide format, it was inner joined with (2) to produce another file (4), a merged file of 1178 students who have graduated within psychology (meaning each students were given a row in the sheet with all relevant information next to the student ID). This means students who did not graduate from the school of Psychology were excluded from further analysis.

To obtain Master Track specialisation, we joined (3) and (4) together to produce another file (5). Identical specialisations with different names were merged. For 1 year Master students who had empty specialisations, we built a text similarity program (cosine similarity) and were able to classify roughly 50% of missing track data.

In (5), 'child' courses were removed and we kept just the Master courses and BSc learning courses the student took. The number of ECs taken by a student was calculated by adding up the 'overdracht' values for each student. The start date of each student was calculated by extracting the first course graduation date, and classifying them into either a February/September start for that particular year. From here, it was possible to calculate the duration in days it took for the student to complete their degree by subtracting the start date from the graduation date. The grade obtained on the thesis was determined by extracting the first grade given on any thesis column in (5).

During the primary analyses, we excluded students who had missing thesis grades. During the secondary analyses, while correlating ECs taken against thesis grades, we also excluded Master students with less than 60ECs and Research Master students with less than 120ECs.

Main results

1. Master's courses and thesis grades
   - Overall correlations
   - Breakdown per Specialisation
2. Bachelor learning courses and thesis grades

Master's courses & Thesis Grades

Approach
From 290 courses available in the Graduate school of Psychology, courses with less than 15 students were excluded due to issues with statistical power. The courses were investigated after having split the data into students who started before 09/2014 and students who started after 09/2014 (due to differences in conditions in which students completed their Master's thesis: students who started their Master's before 09/2014 were able to start the Master's thesis without having completed the Bachelor programme)

Results
Figure 1 shows the six most correlated courses with the thesis grade (cor >= 0.4). Most of these values suggest a moderately positive link - students who took these courses seem to also do well on the thesis. These courses are from all specialisations (both MSc and MRes), as shown in descending order of correlation. It is important to note that many courses refer to the internship or "stage" modules, possibly suggesting that students who do well in their internships are more likely to do better in their thesis grades. However, it may simply be the case that the students completed their thesis while doing the internship. Courses that have moderate correlations (cor >= 0.4) to thesis grades post-2014 are illustrated in *Figure 2*. These courses also include several internship modules, as well as other courses from all specialisations.

Course name	Correlation	Sample size	P-value
Masterstage.Ontw..Psych.	0.618	56	0.000
Data.analyse.Gezondheidsgedrag	0.564	23	0.004
Literatuuropdr..Gezondh..gedr	0.534	23	0.011
Zelfregulatie.Gez.gedrag	0.524	37	0.000
Masterstage.Gedr....Gez.	0.512	45	0.000
Masterstage.Brein...Cognitie	0.476	32	0.005

Figure 1. Courses with the highest correlations between course grades and thesis grade for pre-2014 start student data.

Course name	Correlation	Sample size	P-value
Adviesvaardigheden	0.534	35	0.002
Masterstage.A.O	0.492	74	0.000
MAPS	0.481	33	0.007
Pros..gedrag.in.werkrelat.	0.472	27	0.013
Personeelsselectie	0.461	24	0.022
Masterstage.Gedr....Gez.	0.443	27	0.018
Emotionele.Beïnvloeding	0.433	81	0.000
Recl.VL.Con	0.423	77	0.000
Conflict.en.Coöperatie	0.409	61	0.002
Schr..Onderz..An..Pres	0.407	47	0.002

Figure 2. Courses with the highest correlations between course grades and thesis grade for post-2014 start student data.

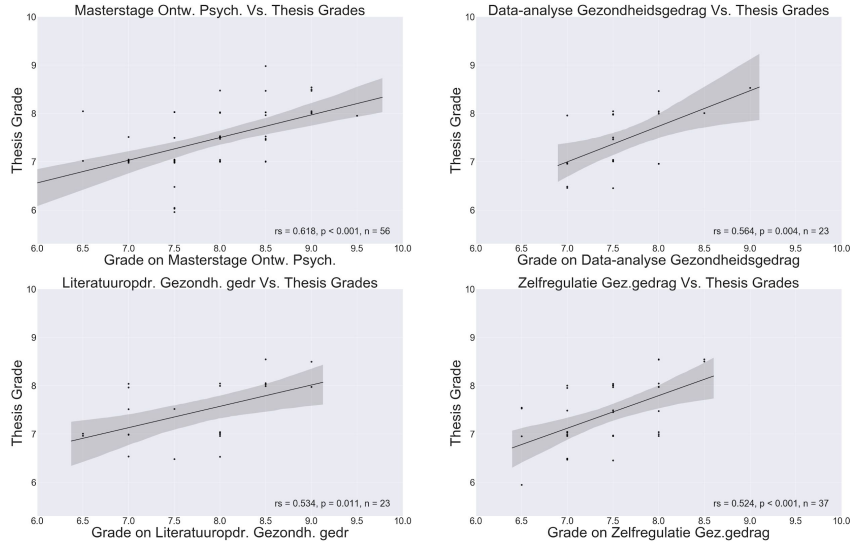# Master's courses & Thesis Grades

The correlations for pre and post-2014 Master's courses are shown in *Figure 3* and *Figure 4*. The current analysis for these correlations focuses on courses from all Psychological departments. The black line represents the line of best fit and the gray shade the 95% confidence intervals.
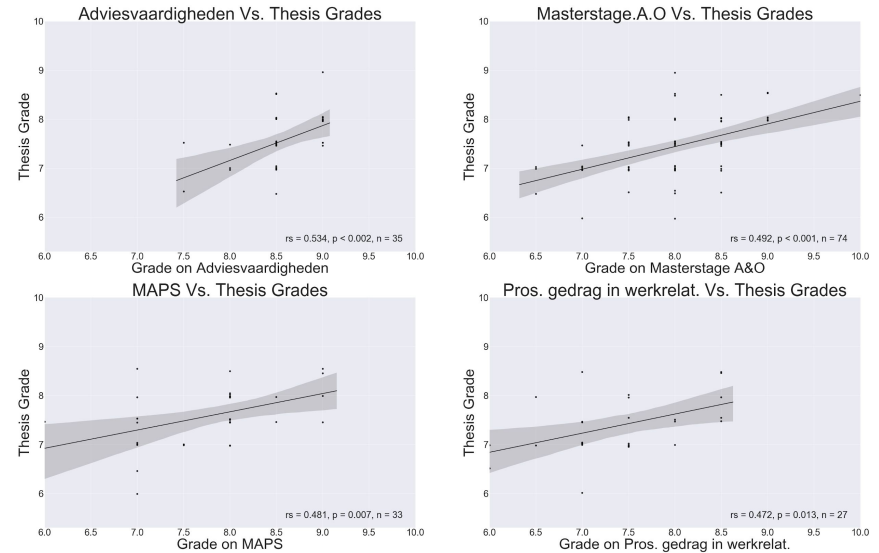

Figure 3. Relationships between courses with the highest correlations between course grade and thesis grade for pre-2014 data.

Figure 4. Relationships between courses with the highest correlations between course grade and thesis grade for post-2014 data.

Further analysis for each specialisation (Pre-2014)

To further investigate the relationship between courses and thesis grade within each specialisation, we selected courses with greater than 20 1-year Master students. MRes students are not included as specialisation is not recorded for this group. *Figure 5* focuses on students who started their MSc before 2014. The 4 most popular courses within each specialisation were investigated. If there was evidence of a link, they were plotted in *Figure* 5.

Courses with correlations greater than 0.3 are included in *Figure 5*. Specialisations are at the top of each graph, and its relationship between the grade on that course and the thesis grade is shown through the line of best fit. The steeper the line, the more correlated the course grade is to the thesis grade. Courses not included in this graph means that the correlation between course grade and thesis grade is weak (i.e. <0.3).
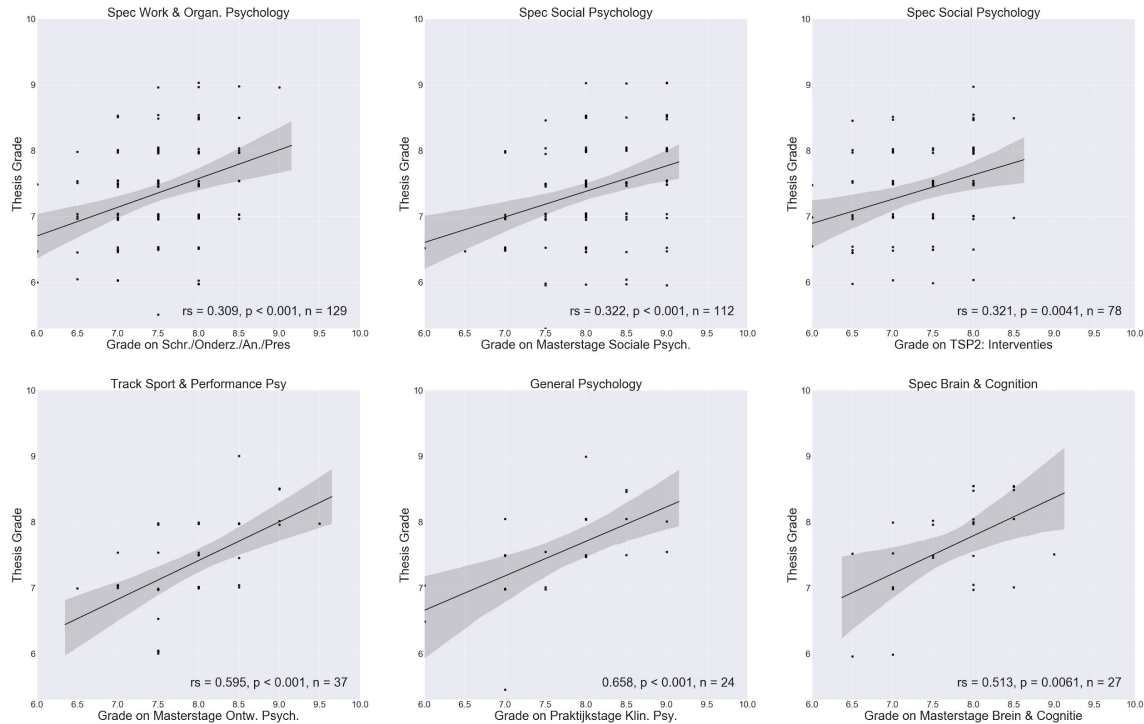

Figure 5. Correlations between popular courses for each specialisation and thesis grades with correlations > 0.30 for pre-2014 data.

Further analysis for each specialisation (Post-2014)

Similar to the procedure used to determine the correlation between course grades and thesis grades for pre-2014 data, we determined the most popular courses for each specialisation and plotted the popular courses showing the greatest link with the thesis grade. *Figure 6* illustrates all the courses with moderate links to the thesis grade (> 0.30). The correlations ranged between 0.32 to 0.46.
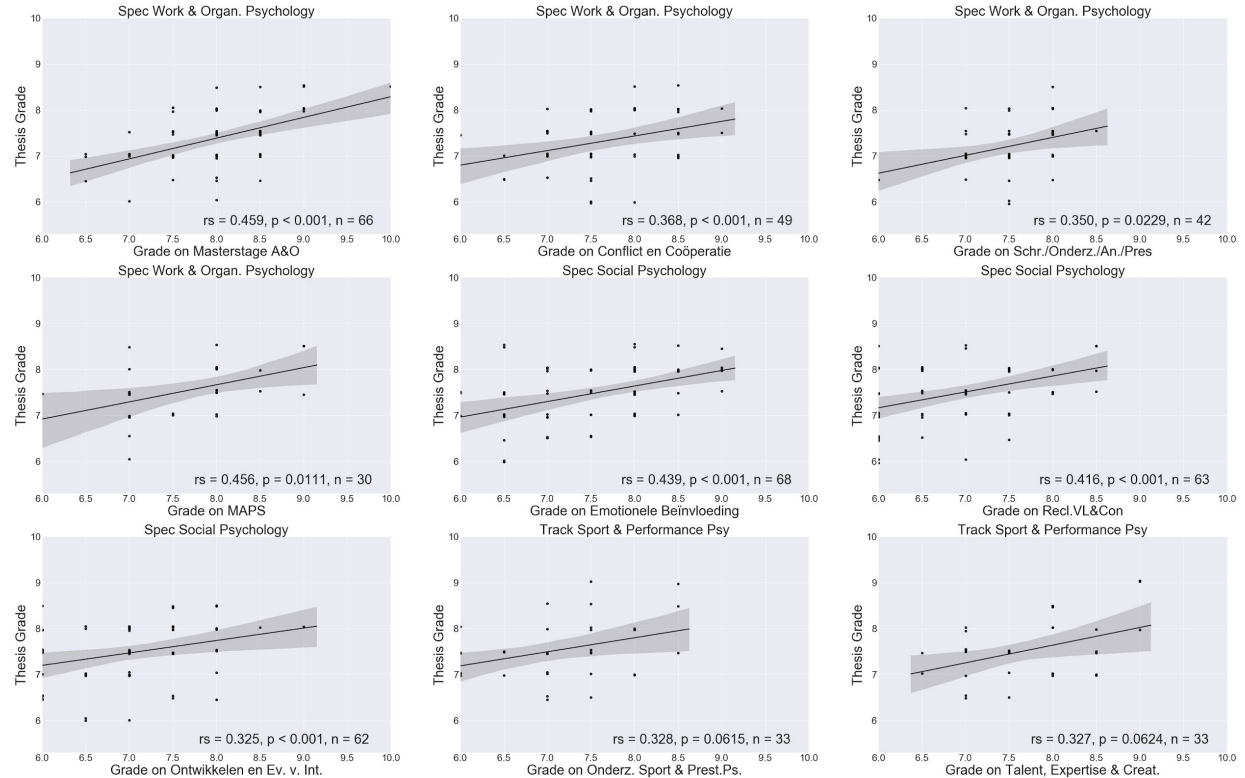

Figure 6. Relationship between popular courses for each specialisation and thesis grades with correlations > 0.30 for post-2014 data.

Learning Course 1: Pract.Onderzoek & Rapp (7202A606)

This course was only seen in students who graduated with a start date of after 09/2014.

It has a moderately positive link with the thesis grade mark. This suggests that students who score highly on this module also tend to do well on the thesis.

Pract. Onderzoek & Rapp. vs. Thesis Grades (Post 2014)

rs = 0.412, p = 0.0017, n = 55

Thesis Grade

Grades on Pract. Onderzoek & Rapp.

Figure 7. Relationship between students' grades on the learning course Pract.Onderzoek & Rapp and thesis grade.

* Added Jitter

Learning Course 2: Propedeusethese TST (7201617P)

This course was taken by both students who started before and after 2014 (illustrated on the left and right graphs, respectively).

There is a moderate positive relationship here. Students who do well in this subject also appear to do well on their thesis, for both pre-2014 start students and post-2014 start students.
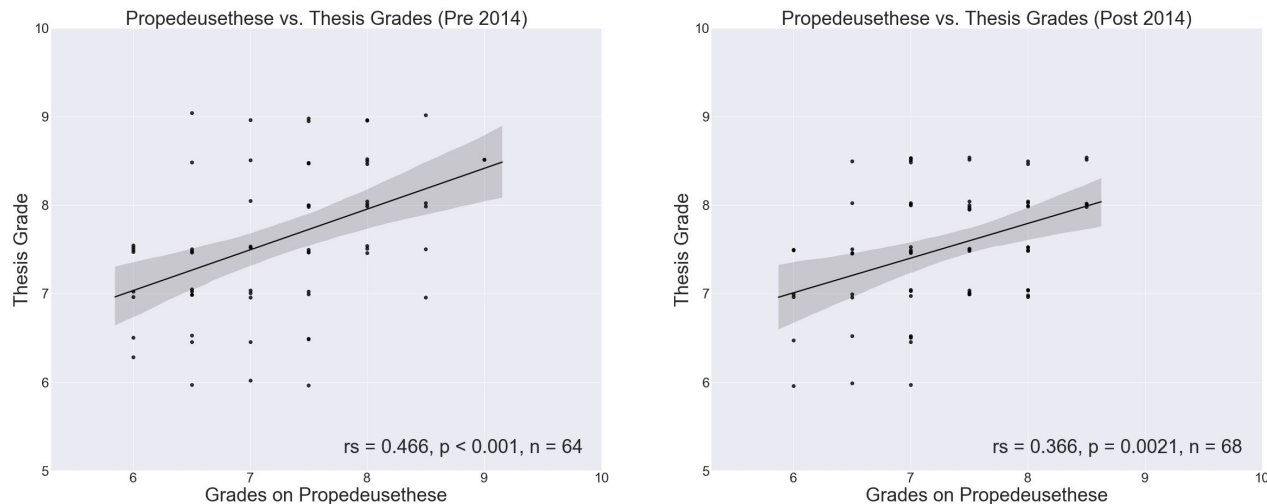

Figure 8. Relationship between Propedeusethese and thesis grade for students who started their Master's before 09/2014 (left) and students who started after 09/2014 (right).

* Added Jitter

Learning Course 3: Wetensch. & Stat. Redeneren T (7202A605/ 7202A609)

This course was only seen in students who graduated with a start date of after 09/2014.

Compared to the previous two courses, there is a smaller relationship: students who do well here do not seem to do as well in their thesis.
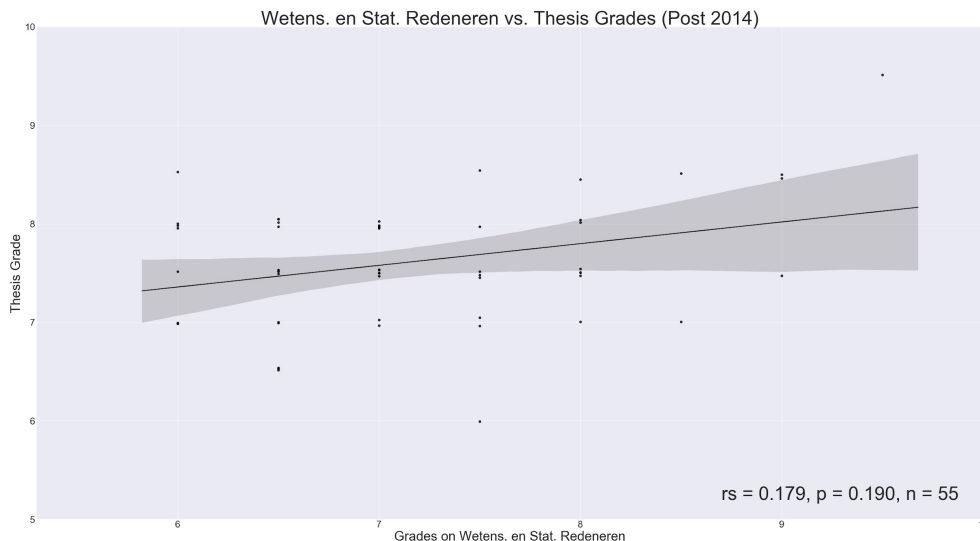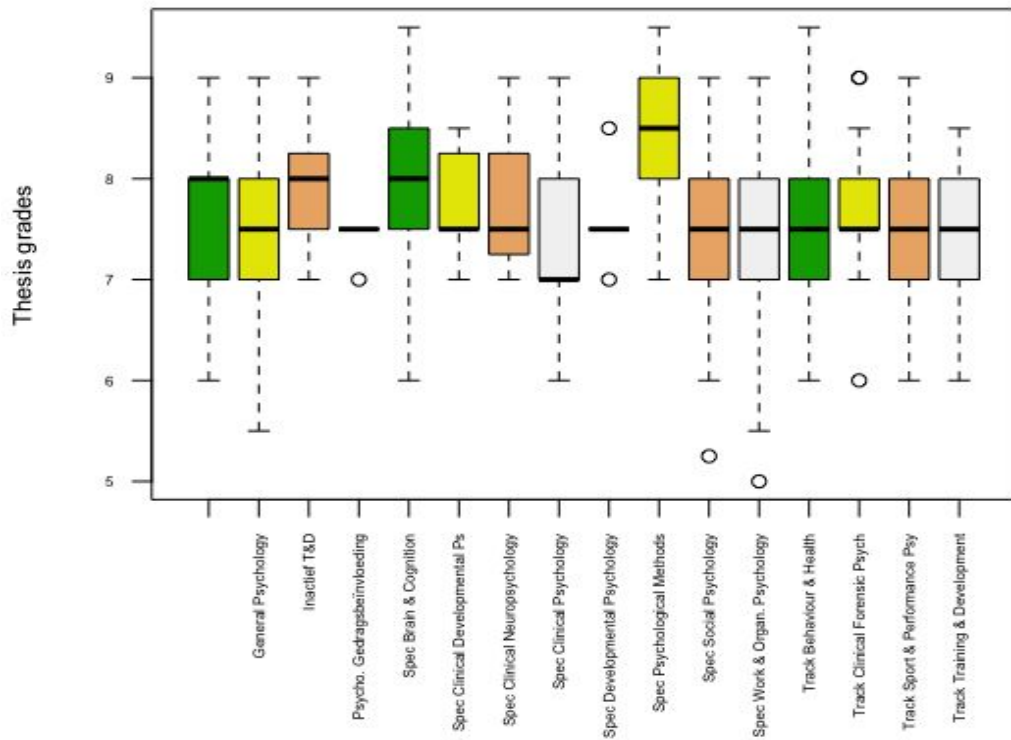

Figure 9. Relationship between Wetensch & Stat Redeneren T and thesis grades.

* Added Jitter

Secondary findings

1. Specialisation and thesis grades
2. Duration and thesis grades
3. ECs and thesis grades

Specialisation and thesis grades

Generally, there doesn't appear to be a mentionable difference in thesis grades between specialisations, given the sample sizes at hand.

One exception is students from psychological methods, who seem to have higher thesis grades compared to other specialisations (mean thesis grade = 8.41; $F(15)=3.18$, $p < 0.05$).

However, there were very few psychological methods students in the data, so the interpretation should not be given too much weight.

Figure 10. Median and range of thesis grades for each specialisation within the Graduate School of Psychology.

Duration and thesis grades (Research Master)

The Master's duration is determined by the days taken to graduate. *Figure 11* illustrates the correlation between duration (days) and thesis grade for Research Master graduates.

The vast majority of students finish within 700-800 days, with the median number of 730 days.

There appears to be a weak, negative correlation between the two, suggesting that taking longer to finish the Master's is weakly linked to a lower thesis grade. However, note this relationship is very small.
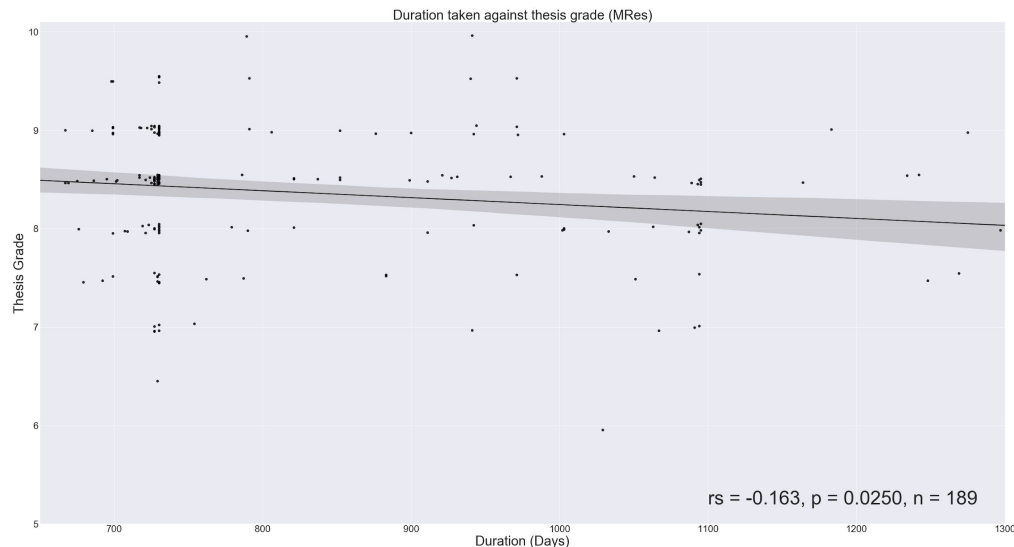
Duration taken against thesis grade (MRes)

rs = -0.163, p = 0.0250, n = 189

Thesis Grade

Duration (Days)

Figure 11. Relationship between duration (days) and thesis grades for Research Master students.

* Added Jitter

Duration and thesis grades (1 Year Master)

Figure 12 illustrates the relationship between the duration (days) of the Master's degree against students' thesis grades for 1 Year Master graduates.

There is a larger spread in the number of days a student took to finish the MSc compared to MRes students. The median time taken was 568 days.

Again, there is a weak link suggesting students who took longer to complete their MSc program got slightly lower thesis grades.
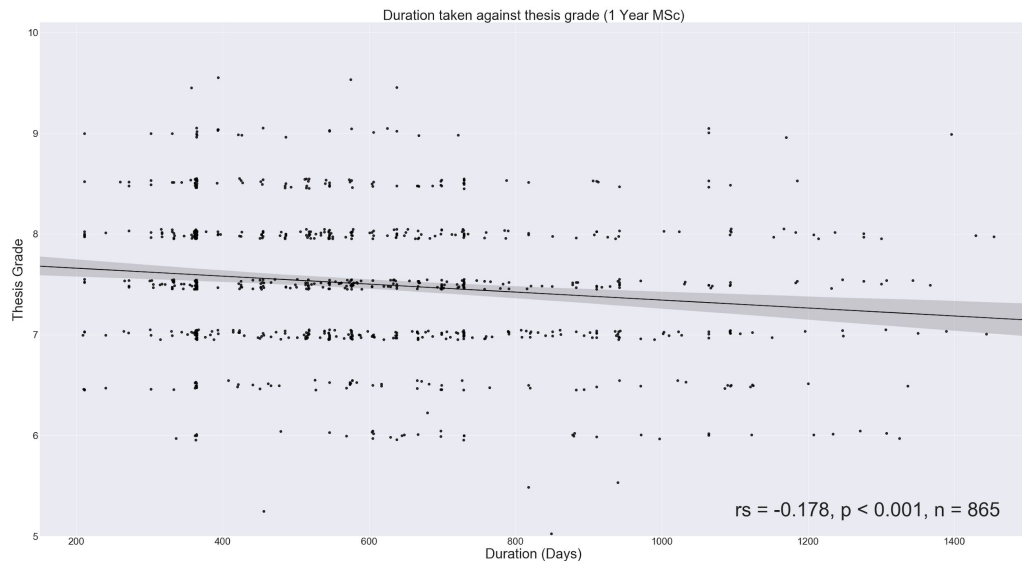
Duration taken against thesis grade (1 Year MSc)

rs = -0.178, p < 0.001, n = 865

Figure 12. Relationship between the number of days it took to complete the MSc and the thesis grade obtained.

* Added Jitter

Duration and thesis grades
(Social Psychology and Work & Organisational Psychology)

Social psychology (left graph) and Work and Organisational Psychology (right graph) students appear to share the biggest negative relationship between the number of days taken to graduate and the grade obtained on the thesis. That is, in both cases, taking longer to graduate seems to be slightly linked to a lower thesis grade.

However, in both cases, the relationship is still weak. For Social psychology, the negative link between duration and thesis grade is slightly stronger (-0.255) than for Work and Organisational psychology (-0.187).

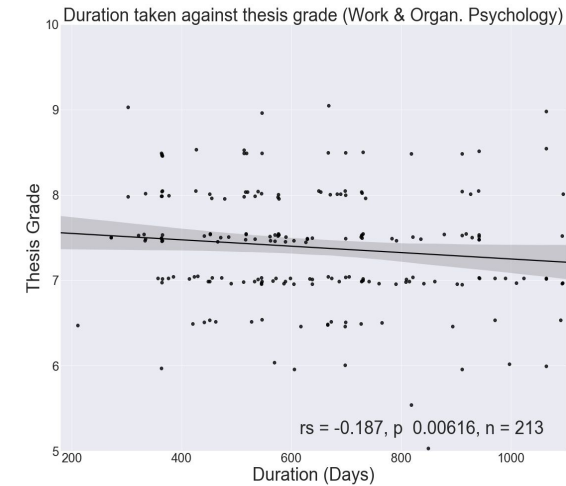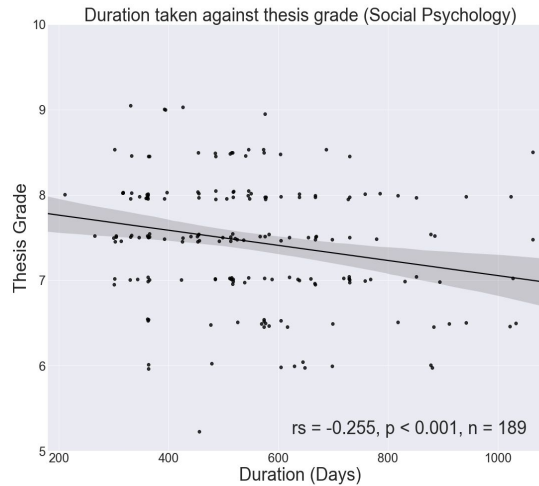Other specialisations generally also had weaker negative relationships.

Figure 13. Relationship between duration (days) and thesis grades for 1-year Master students within Social psychology (left) and Work & Organisational psychology (right).

* Added Jitter

EC and thesis grades (Research master & 1-year master)

Figure 14 illustrates the relationship between the number of ECs taken and thesis grade for Research Master students. There is little evidence to suggest that any relationship exists between taking more credits and obtaining a better thesis grade.

Similarly, the relationship between ECs taken and thesis grade for 1-year Master students is shown in *Figure 15*. Here, there is a very weak relationship where students who take more credits seem to do slightly better in their thesis. However, this link seems to be extremely small.
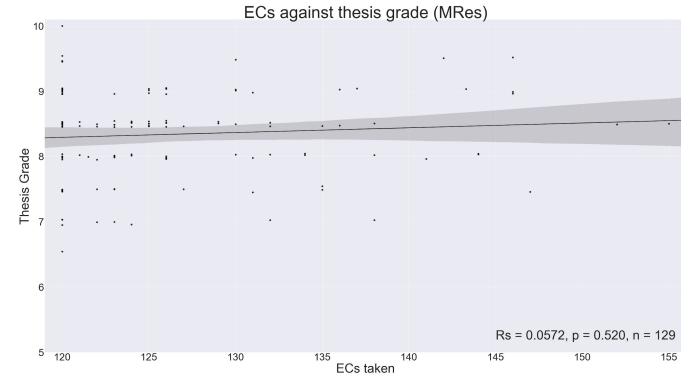

Figure 14. Relationship between ECs taken and thesis grade for Research Master students.
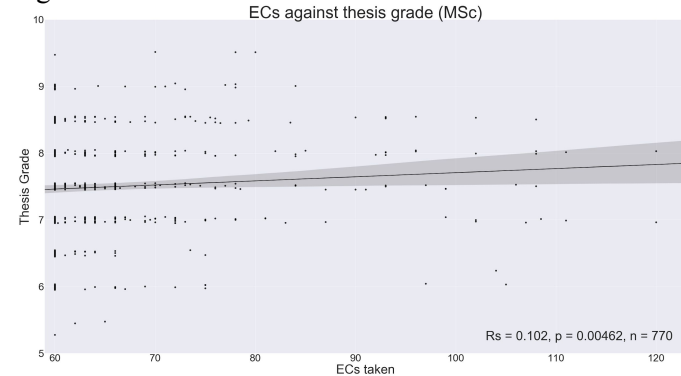

Figure 15. Relationship between ECs taken and thesis grade for 1-year Master students.

* Added Jitter

EC and thesis grades (Track Training & Development)

Students who took more ECs in the Training and Development track seem do slightly better in their thesis compared to other specialisations.

However, as there are less students who took a high number of ECs, it is important to be cautious in the interpretation.
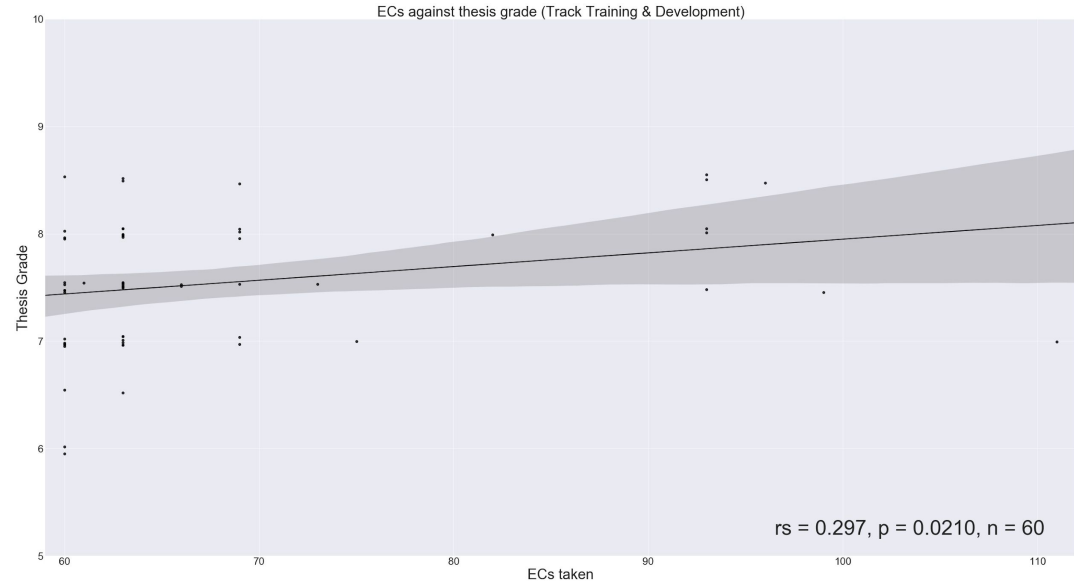

Figure 16. Relationship between ECs taken by students from the Track Training & Development (1 year MSc) and thesis grade.

* Added Jitter

Conclusion & recommendations

The correlations obtained from all courses within the Graduate School of Psychology suggest that students' grades on the internship modules are linked more so to the thesis grades, compared to other courses. However, this may be because students take up the option to do their thesis while doing their internship. Within each specialisation, the most popular courses whose grades are moderately linked to the thesis grades are presented. For the Bachelor learning courses, the Pract.Onderzoek & Rapp and Propedeusethese TST courses appear to be moderately linked to doing well in the thesis. However, the course Wetensch. & Stat. Redeneren T only shows a weak relationship, which suggests that doing well in this course does not necessarily transfer as well to doing well in the thesis.

For the secondary findings, firstly students within the Psychological methods department appear to do better in their thesis than students from other departments. However, the reliability of this result is questionable due to a small sample size. Secondly, overall there appears to be a small negative link between how long a Master's takes and thesis grades. That is, students who take longer to graduate tend to score slightly lower on the thesis grades. However, the link is generally small and may not necessarily mean that students who take longer will obtain much lower grades for the thesis. Slightly stronger links were found for Social psychology and Work & Organisational psychology, although these links are still small. What this suggests is students from these tracks do slightly worse than their peers do on the thesis when they take longer to graduate. Lastly, there appears to be a weak positive link between the number of ECs taken and thesis grade (the strongest correlation found in Social Psychology track), however taking more ECs does not significantly help students obtain a higher thesis grade. Thus, it is likely that doing more ECs than necessary does not translate over to a better thesis grade.

In terms of recommendations, we advise the client to continue to provide the compulsory modules Pract.Onderzoek & Rapp and Propedeusethese TST. The client may also continue to provide the course Wetensch. & Stat. Redeneren if he wishes. In addition, should the client wish for analysis to be done regarding the influence thesis duration has on the thesis grade, we recommend that the client implements a structured approach to record the start date of the thesis project in the future.