Long Term Prediction of Admission Measures: the case of Saudi Arabia

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General Aptitude Test (GAT) and Standardized Achievement Admission Test (SAAT) were developed for university admission. All universities in the Kingdom of Saudi Arabia use both of them as an admission criterion for more than 17 years. Students who took those tests have graduated from universities and either applied for a job or continue their graduate studies. Most institutions require applicants for graduate study to take an admission test. On the other hands, some jobs require testing for certification. Accordingly, the present study investigates the prediction power of the two admission tests for future performance in other tests. But, one just wonders how consistent is the correlation of the GAT and SAAT with other tests over different data set? It would be important to answer such question before one gets to the contribution of those two tests to the explanation of the variance of other tests. In fact, the study tries to answer the following questions:

How much variance can either GAT or SAAT or both explain from the following tests:

- post-graduate general ability test (PGAT)?

- engineering licensure test (general or subject)?

- teacher certification test (general or subject)?

- District attorney licensure test?

- general employability test?

Method

Samples:

Table 1 indicates number of respondent in each dataset. The data for this study is collected from samples across the year. The inclusion criterion is that a person had taken GAT and SAAT and at least one test after graduation from university. Accordingly, I have collected five data set that satisfies those condition on the afore mentioned tests. Some of them have been found in more than one set such as PGAT. This multiple present give assurance about the consistency of the nature of the relationship. However, data were merged for the same variables across dataset for long term prediction. For example, datasets 1-5 were merged to estimate the explained variance of PGAT by GAT and/or SAAT, and so on for the other variables.

Dataset	Sample size	Test1	Teste2	Test3	Test4	Test5
1	593	GAT	SAAT	PGAT	TLT	STEP
2	211	GAT	SAAT	PGAT	TLT	DAT(Scopa)
3	1301	GAT	SAAT	PGAT	TLT	GCAT
4	345	GAT	SAAT	PGAT	TLT	
5	1279	GAT	SAAT	PGAT	GE	
6	1045	GAT	SAAT	GE	SE	

Instruments:

GAT is a university admission test that has two subtests, verbal (52 items) and quantitative (44 items). Reliability of verbal section is 0.90 or higher and quantitative reliability is 0.92. correlation of the test with high school GPA ranges from 0.45 to .59 in several studies. Other studies investigate the factorial structure of the test. Bi-factor as well as unidimentionality of the test was confirmed. Dimitrov studied the test unidimentionalty and factorial structure. The results support the argument that the test data are essentially unidimensional, with one general factor of verbal aptitude and the three content specific domains as latent aspects of the verbal aptitude (1). Similar results were found for the quantitative section. Dimitrov (2) found that the test is unidimensional and has general factor as well as specific factors

SAAT: standardized Achievement Admission Test is an admission test that covers four subject matters: biology, chemistry, physics, and math. Owidha (3) investigates its factorial structure through two approaches, mainly, item response theory (the Rasch model) and confirmatory factor analysis of item parceling. The findings of both paradigms lend support to the internal construct validity of the SAAT in terms of its score interpretations and use. Tsaousis 2017 (4) studied Common characteristics of the constructs underlying GAT and SAAT (Art Major). The results indicate that there are indeed conceptual links between GAT and SAAT tests (Art Major), especially in terms of the verbal domain. Further analysis suggests that despite the conceptual similarity between the two tests, each of them seem to measure distinct constructs. Additionally, it was found that SAAT can predict future academic performance at undergraduate level, over and above high school GPA and GAT scales, suggesting that both tests can be considered as useful predictors of academic performance at the field of humanities.

Teacher Licensure Test: General (TLTG) is a test that covers pedagogy of teaching in several important components. Tsaousis (4) investigates its factorial structure and found that the test is a unidimensional scale measuring a general competency factor (2015).

Teacher Licensure Test: Specific (TLTS) is a test that covers the subject matter of specialization (i.e. chemistry. Physics). Those tests were reliable. Dimitrov (6) studies indicated that Latent variable modeling reliabilities ranges from 0.772 for geography to .867 for biology major (D. Internal structure studies indicate that those test are unidimensional.

Standardized Test for English Proficiency (STEP) is an English language test that measures A1 to B2 of the CEFR. The domains that it covers are structure, reading comprehension, compositional analysis, and listening comprehension. All scores are accompanied by relevant CEFR descriptors to facilitate score interpretation. Hence, the assessment record provides descriptors for both the total score as well as the sub-scores.

PGAT is general ability admission test for graduate schools. It measures abilities important for success in graduate studies as well as ethical issues related to research.

GCAT is an employability test that measures four components: verbal ability, quantitative ability, spatial ability, and mechanical ability. The test has good reliability of 0.91 and above.

DAT is a test for selecting district attorney. It has four components: cognitive ability, achievement component, personality component, and social competency component, the test has good reliability (0.87 and more for the components). Jehangir (2017) investigated the factorial structure of DAT and concluded that the two factor structure met the criteria for good fit.

GE and SE are measures of engineering competencies. Those tests cover the major components of engineering competencies. It has good estimation of reliability 0.90 and above, Tsaousis (7) studied the factorial structure of the test and found that the

test " has been designed to assess not only fundamental engineering knowledge, but also general scientific skills" (2016, p.18). Alkhalaf 2016(8) Examined dimensionality, factor structure and reliability of the engineering test. She concluded that the test factors support the theoretical factorial structure and the reliability was 0.92

Results

Consistency of relationship:

Figure 1 show the correlation of GAT and SAAT with PGAT across different data sets. The correlation of GAT with PGAT ranges from 0.71 to 0.76, and correlation of SAAT with PGAT ranges from 0.40 to 0.52.

It can be said that the correlations are consistent across data sets for both GAT and SAAT, and the correlations of GAT with PGAT are much higher than the correlation of SAAT with PGAT.
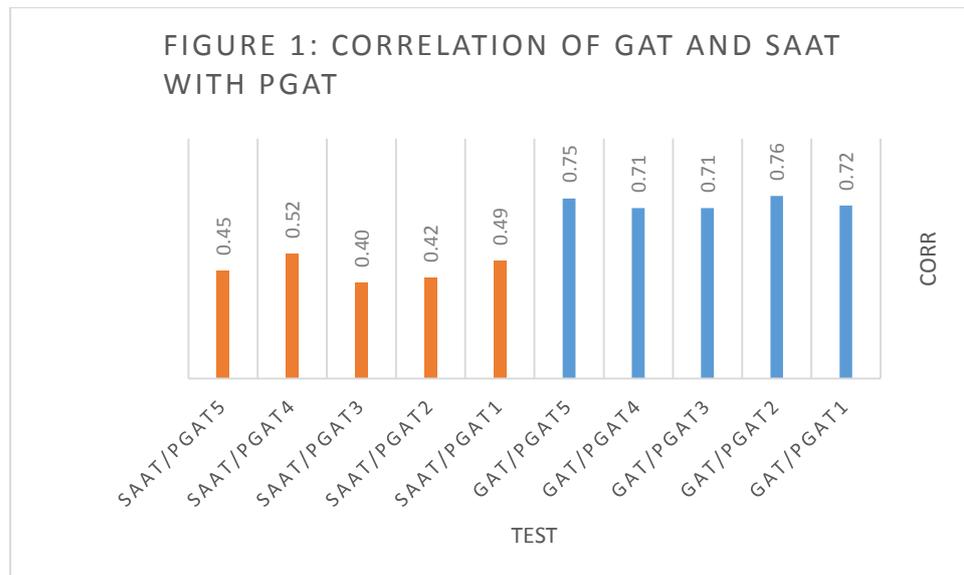

FIGURE 1: CORRELATION OF GAT AND SAAT WITH PGAT

Figure 2 show the correlation of GAT and SAAT with teacher licensure test, both general(TLTG) and subject(TLTS) tests, across different data sets. The correlations of GAT with TLTG ranges from 0.53 to 0.61, and correlation of SAAT with TLTG ranges from 0.34 to 0.45.

It can be said that the correlations are consistent across data sets for both GAT and SAAT, and the correlations of GAT with TLTG are higher than the correlation of SAAT with TLTG. For the teacher licensure subject test(TLTS) the correlation follow the same pattern but with low correlation (figure 2).

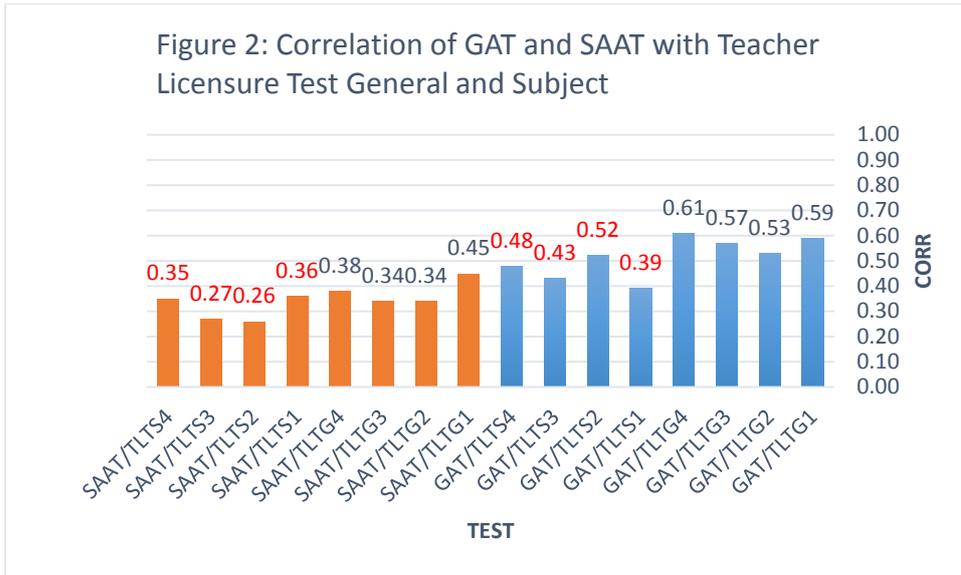Figure 2: Correlation of GAT and SAAT with Teacher Licensure Test General and Subject

Figure 3 show the correlation of GAT and SAAT with general cognitive ability test (GCAT), district attorney test (DAT), and standardized English proficiency test(STEP). GAT correlate higher with those tests than SAAT. In fact, GAT correlations ranges from 0.43 to 0.71 with those test with highest correlation with GCAT; while SAAT correlations ranges from 0.26 to 0.39 with the same tests.
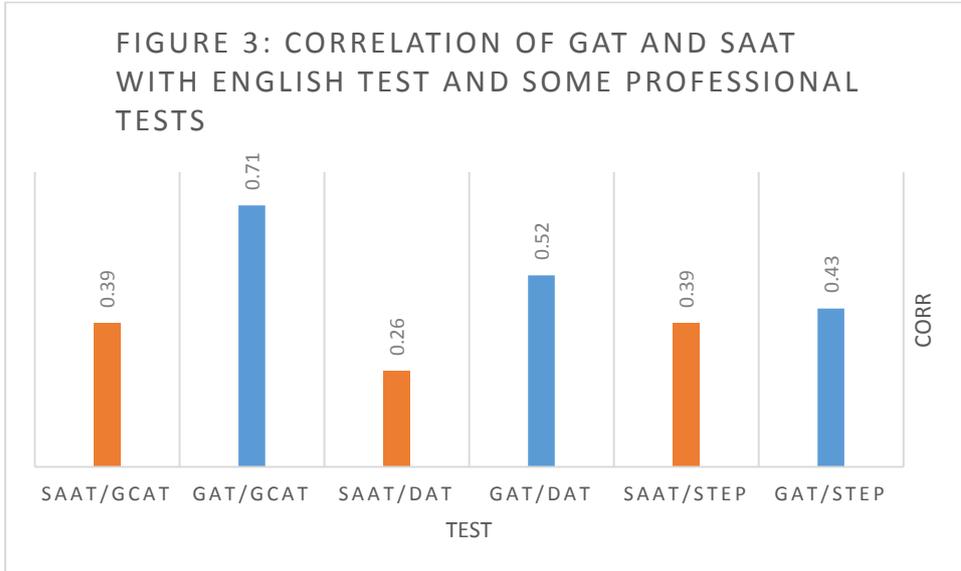

FIGURE 3: CORRELATION OF GAT AND SAAT WITH ENGLISH TEST AND SOME PROFESSIONAL TESTS

Figure 4 show the correlation of GAT and SAAT with engineering general licensure test (ENGG) and engineering specific licensure test (ENSG. GAT correlate slightly higher with those tests than SAAT. In fact, GAT correlates 0.47 with ENGG and 0.28 with ENGS; while SAAT correlates 0.44 with ENGG and 0.27 with ENGS.

Figure 4: Correlation of GAT and SAAT with Engineering General and Subject Tests.
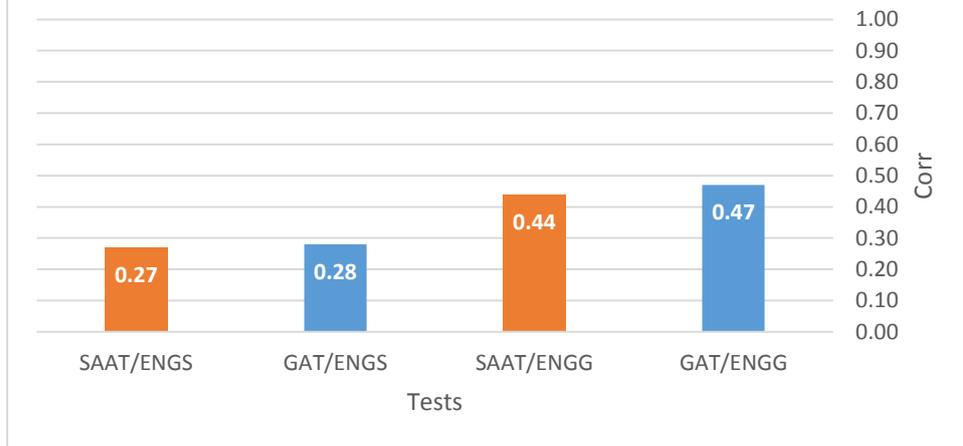
Can GAT or and SAAT predict future performance in other tests?

Figure 5 indicates R sequare change of GAT and SAAT in predicting score in engineering licensure, teacher licensure, district attorney licensure, emplybility, post graduate addmission, and standardized English proficiency tests. The most prevailing result is that GAT is dominant in explaining variance of those tests.the contribution of SAAT in the explained variance is very minimal and in some tests is zero such as DAT.

What does that mean?

It means that GAT can predict performance in licensure tests and graduate admission tests. Furthermore, it means that GAT has more power in predicting long term performanec than SAAT.

Figure 5: R Square Change of GAT and SAAT in Predicting Different Performance Later on
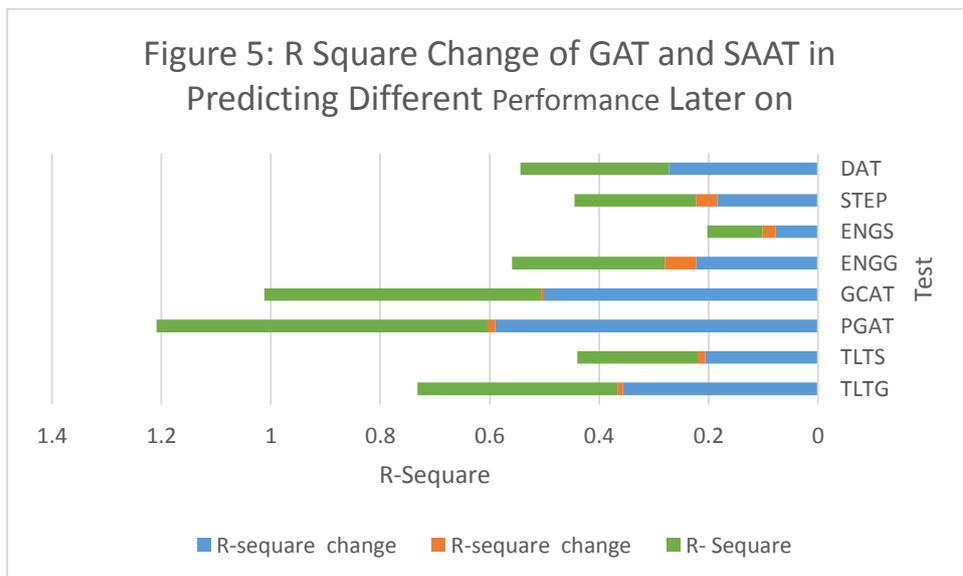
Figure 6 show standardized beta coefficient for GAT and SAAT in predicting performance in other tests. What can be said is that all betas are significant for both GAT and SAAT, but GAT surpass SAAT in prediction. In fact, GAT can predict to a large extent performance in GCAT and GTLG, while SAAT can not.

FIGURE 6:STANDARDIZED BETA VALUES FOR GAT AND SAAT FOR DIFFERENT TEST SCORES

STANDARDIZED BETA
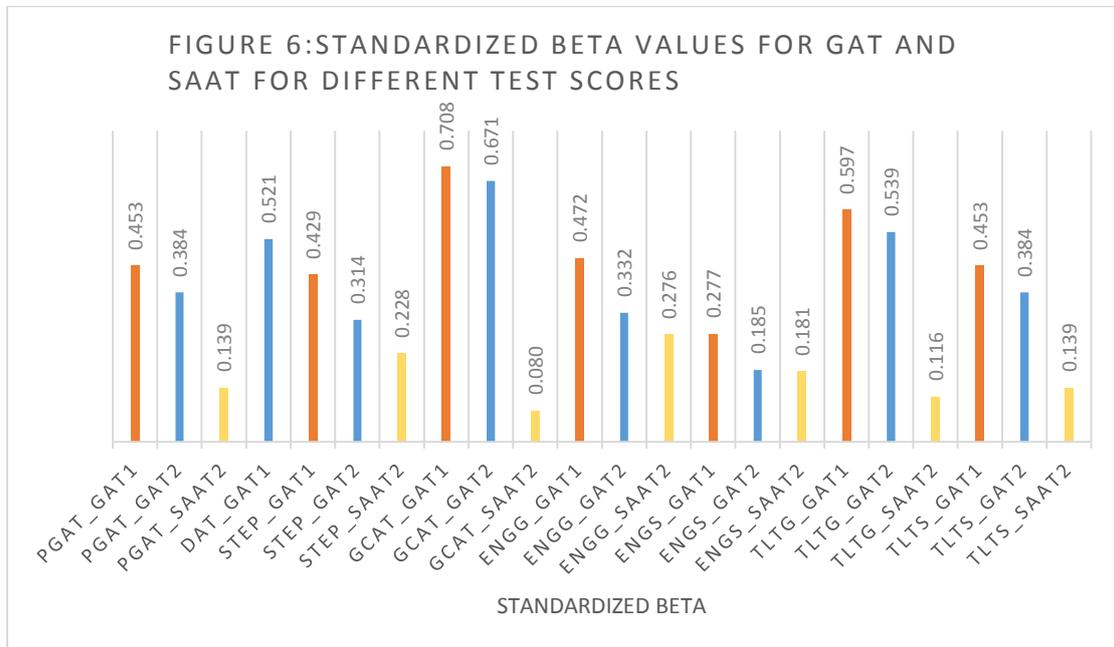
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