Cognitive and Social Antecedents of Academic Success

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BACKGROUND OVERVIEW

- Having the predictive ability to understand and explain the academic successes and failures of students is of the **utmost importance in higher education** (Fenollar, 2008; Ruban & McCoach, 2005).
- Academic achievement is strongly influenced by **individual differences** (Komarraju et al., 2009; Pintrich & Schunk, 1996; Rothstein et al., 1994).
- O'Connor and Paunonen (2007) recommend that researchers use **multiple predictors inclusive of personality, motivation and study habits** when predicting academic achievement outcomes.

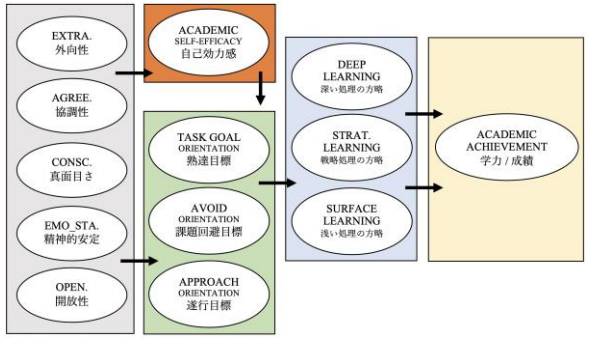
CONCEPTUAL APPROACH

- Informed by a social cognitive approach to self-regulation and learning (Zimmerman, 2002), this **study assesses the predictive validity of personality, motivation and study related variables to the academic achievement of university students**.
- Personality traits and academic self-efficacy are expected to orientate individual students toward certain goal-orientations (achievement motivations), which will promote different approaches to learning and consequently, differentiations in academic achievement outcomes.

METHODOLOGY / INSTRUMENTS

- **256 Japanese university students**
- 204 (79.7%) male and 52 (20.3%) female.
- All measures completed in Japanese during 2018.

- **Personality:** Japanese version of the Ten-Item Personality Inventory (TIPI) (Gosling et al., 2003). The TIPI-J has been shown to correlate with the more extensive NEO-PI-R-J (Japanese version of the NEO Personality Inventory) and is an adequate representation of the five-factor model of personality (Oshio et al., 2012, 2013).
- **Academic Self-Efficacy:** 8-item measure modified from the Motivated Strategies for Learning Questionnaire (MLSQ) (Pintrich & De Groot, 1990). Assessed on a five-point scale and concerned perceptions of confidence and competence related to enrolled courses (e.g., "I'm certain I can understand the ideas taught in my classes").
- **Goal Orientation (Achievement Motivation):** 18-item instrument drawn from the Goal Orientation Scale developed by Midgley et al. (1998). Pertains to the achievement motivation of students and is divided into conceptual three factors (task, ability-approach and ability-avoid).
- **Approaches to Learning:** 52-item Revised Approaches to Studying Inventory (RASI) developed by (Entwistle & Ramsden, 1983). Uses a five-point scale to assess the tendencies of students to use deep, strategic and surface approaches to learning.
- **Academic Achievement:** Sum of five compulsory course grades taken from the first semester during 2017 and 2018. The five subjects included Communication, Virtual English Program, Analytics, Linear Algebra and Practical Mathematics.



DATA ANALYSIS

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	-												
2	.03	-											
3	.15*	.12*	-										
4	-.04	.06	.26**	-									
5	.19**	.07	.15*	-.08	-								
6	.04	.23**	.32**	.31**	.12*	-							
7	.22**	.02	.14*	.14*	.20**	.13*	-						
8	-.18**	-.03	-.07	.00	-.43**	.10	-.05	-					
9	-.05	.22**	-.01	.18**	-.11	.56**	.03	.26**	-				
10	.32**	-.03	.15*	.05	.10	.22**	.47**	.09	.07	-			
11	.28**	.13*	.43**	.03	.30**	.39**	.50**	.05	-.01	.41**	-		
12	-.18**	-.03	-.11	-.18**	-.21**	-.16**	-.22**	.33**	.09	-.04	-.04	-	
13	-.13*	.09	.26**	.12*	.03	.36**	.25**	-.14*	.01	.10	.18*	-.40**	-

1. Extraversion 2. Agreeableness 3. Conscientiousness 4. Emotional Stability 5. Openness 6. Academic Self-Efficacy 7. Task Orientation 8. Ability-Avoid Orientation 9. Ability-Approach Orientation 10. Deep Approach to Learning 11. Strategic Approach to Learning 12. Surface Approach to Learning 13. Academic Achievement

	All Students (n-256)				High-Achievers (n=128)				Low-Achievers (n=128)			
	R^2	ΔR^2	B	t	R^2	ΔR^2	B	t	R^2	ΔR^2	B	t
Step 1	.10				.04				.17			
		F(5, 250) = 5.86***				F(5, 122) = 1.08				F(5, 122) = 5.05***		
Step 2	.18	.08***			.04	.00			.19	.02		
		F(6, 249) = 9.43***				F(6, 121) = .89				F(6, 121) = 4.79***		
Step 3	.33	.14***			.27	.23***			.50	.31***		
		F(9, 246) = 13.69***				F(9, 118) = 5.01***				F(9, 118) = 13.27***		
Step 4	.41	.08***			.28	.01			.55	.04**		
		F(12, 243) = 14.37***				F(12, 115) = 3.85***				F(12, 115) = 11.74***		
Extraversion			-.29***	-5.26			.35**	3.12			-.12	-1.68
Agreeableness			.03	.67			-.24*	-2.00			-.19	-1.95
Conscientiousness			.16**	2.75			-.08	-.69			.32***	3.75
Emotional Stability			-.13*	-2.47			.11	1.20			.00	.07
Openness			-.18**	-3.06			-.34**	-3.10			.10	1.06
Academic Self-Efficacy			.44***	5.70			-.19	-1.38			.20*	2.02
Task-Goal			.23***	3.53			-.14	-1.01			.58***	4.42
Ability-Avoid			-.13*	-2.20			-.55***	-4.66			.24*	2.59
Ability-Approach			-.20**	-2.92			.45**	3.20			-.27**	-3.03
Deep Learning			.03	.61			.08	.84			-.05	-.47
Strategic Learning			-.06	-.79			.08	-.65			-.07	-.74
Surface Learning			-.31***	-5.48			.12	.92			-.22**	-2.87

CONCLUSIONS

- Approximately **41% (overall sample)**, **28% (high-achievers)** and **55% (low-achievers)** of academic achievement variance was explained in this study.
- Non-cognitive individual differences play a greater role in academic achievement among **low-achievers** than high-achievers (where intelligence is less dominant).
- **Goal Orientation (Achievement Motivation)** is the strongest factor in explaining differentiations in academic achievement although between the high-achievers and low-achievers there are **distinct differentiations** in the contributions made by each of the goal-orientation indicators.
- Among the low-achievers **personality traits accounted for approximately 17% of the cumulative variance observed**. Here, **conscientiousness** - "the crucial noncognitive predictor for school achievement" (Dumfart & Neubauer, 2016, p. 8) - was the only trait to have a significant impact upon academic achievement outcomes.
- **High-achievers and low-achievers learn in different ways**. Individual differences in **personality, motivation and study habits are trackable and do have a significant impact on academic achievement outcomes.**
- The data can support teachers in developing ways to identify students on the basis of personality, motivation and study habits and to tailor specific initiatives and interventions to individual students to maximize their learning outcomes.

e-Learning & Innovative Pedagogies

Use of the "DrugSpeak" tool for improving student drug pronunciation skills

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SHORT DESCRIPTION

Here we present a technology-based and research-informed project aimed to improve verbal skills in a 2nd-year undergraduate Pharmacy and Pharmacology students to address difficulties/errors in the correct pronunciation of more than 100 drug names.

LONG DESCRIPTION

Using a research-informed approach, we aimed to address this by developing and implementing a drug language tool named "DrugSpeak" aimed at increasing student proficiency in pronouncing drug names. Initially, we surveyed experienced Clinicians on the development of refined drug language skills, and obtained audio recordings of 100 drug names from these experts. Face- and eye-tracking technology was incorporated into the recordings to allow for the simultaneous acquisition of audio and face/eye movement during the pronunciation of the drug names. Based on the data acquired from this phase of the study, video presentations and a DrugSpeak "workshop" were developed and embedded within the student coursework to provide students with an understanding of phonetics, thus facilitating proficiency in drug name pronunciations. Student surveys and audio recordings based on drug pronunciations were conducted before and after the videos/workshop. Quantitative and qualitative data gathered following intervention with DrugSpeak will be rigorously analysed to reveal evidence of positive impacts on student oral assessment tasks, as relevant to drug pronunciation skills.

BACKGROUND AND RESEARCH QUESTION

Poor language skills in terms of pronouncing drug names has been an ongoing and prevalent problem for students in our Bachelor of Pharmacy program. It leads to poorer student performances in oral assessment tasks and at job interviews, jeopardizing their employment prospects. Students also hail from diverse language backgrounds which can exacerbate difficulties in pronouncing drug names. Furthermore, these future graduates will be required to work in a multidisciplinary environment where verbal communication between health professionals is of paramount importance. Indeed, research shows that errors in pronunciation causes spelling mistakes, leading to errors in filling/writing prescriptions, consequences of which may be life-threatening. Thus, we initiated a project to design and implement a learning tool/program to help students in correctly pronouncing drug names. This program was named DrugSpeak, and the key research questions we sought to address were:

- "Can we help students expediently develop the drug pronunciation skills resembling that of an experienced clinician or academic in our field?"
- "Does a drug language teaching tool improve student's ability to pronounce drug names correctly?"

METHODOLOGY AND PARTICIPANTS

A flowchart showing the research methodologies and interventions used in the project in shown in Figure 1. Briefly, the following steps were taken:

1. We recruited 20 Pharmacy and Pharmacology academics as well as experienced clinicians, and recorded audio of their pronunciation of 100 drug names containing a broad mixture of different phonetic characteristics, as prompted by a series of Powerpoint slides. Eye- and face-tracking was conducted simultaneously as these experts completed the task. This was done in order to obtain information on the combination of speech, eye and face movements in drug name pronunciations by experts.
2. Student volunteers from a 2nd-year Pharmacy course also completed the task, although only audio recordings were obtained. The students also completed a survey on their demographic and language background, as well as perception of their own verbal skills.

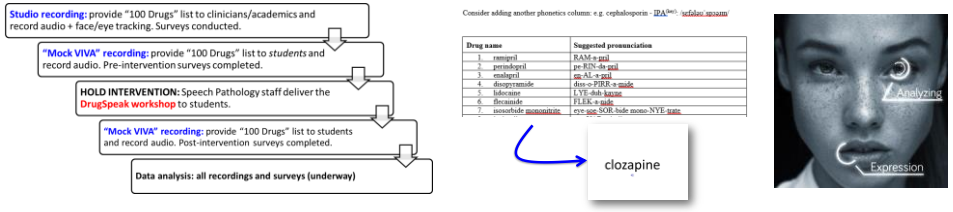

Figure 1. Summary of the methodologies used in the DrugSpeak project (left), the list of drugs used to make the Powerpoint slides for studio recordings of clinicians/academics and students (centre), and use of eye- and face-tracking (right) to record facial expressions and eye movement (visagetechnologies.com).

3. Students were provided three 10-minute videos uploaded onto their learning management system, which covered the basics of word pronunciation, stress placement and an understanding of syllables (Figure 2) and engaged in the supplied active learning tasks.

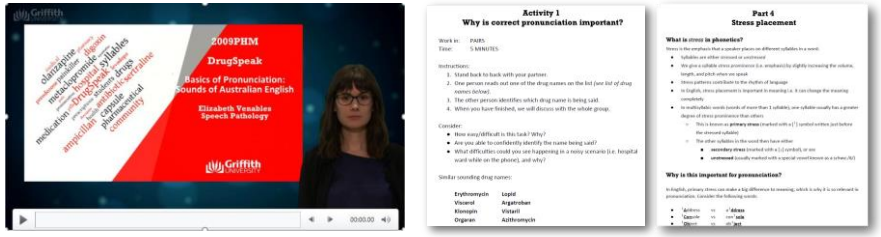

Figure 2. Examples of video content and active learning tasks for students on word pronunciations.

4. Students attended the DrugSpeak workshop (Figure 3) which had been embedded within the course curriculum. Here, they received face-to-face training on phonetics, and engaged in team-based tasks on drug name pronunciations.

Figure 3. The DrugSpeak workshop on phonetics with emphasis on the pronunciation of drug names. On the left is the live workshop, while on the right are excerpts from documents supplied to students during the workshop to reinforce the learning objectives.

5. Audio recordings of students were obtained at the end of semester, using the same list of drug names as in Step 2. This was done to determine an impact of the DrugSpeak workshop and resources on student drug pronunciation proficiencies.

RESULTS AND CONCLUSIONS

This study is currently a work-in-progress, as survey and audio (and face-eye-tracking) data analysis is underway. Ultimately, the anticipated outcomes of this project include the enhancement of student performance in verbal assessment tasks, improved quality of graduates and job prospects, positive impact on patient health care, and delivery of a product that is especially beneficial for our non-native English-speaking international students.

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