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Kutuk, G, Putwain, DW, Kaye, L and Garrett, B

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Development and Validation of a New Multidimensional Language Class Anxiety Scale

- Supplementary Materials -

This document contains materials designed to supplement the main text. The materials include the following:

The structures of the model with the best fit and of the others

Figures

Appendix containing all self-report items used in the study

Mplus Syntax

The structures of the model with the best fit and of the others are explained in detail below:

Hypothesized models of L2 anxiety.

Model 1: Lower order correlated residuals. Model 1 hypothesizes that thirty items form into five lower order factors namely *listening activity anxiety (LAA)*, *reading activity anxiety (RAA)*, *speaking activity anxiety (SAA)*, *writing activity anxiety (WAA)* and *classroom testing anxiety (CTA)*. It is also assumed that the lower order factors correlate with each other. Six items are attributed to each L2 domain. Within each L2 domain, there were two cognitive items, two affective items, two physiological items. In this model, the residuals variances of cognitive, affective and physiological items across different L2 domains were allowed to correlate (Figure 1). The correlated residuals were specified a priori. Without exception, all the residuals variances of the cognitive, affective and physiological items across different L2 domains were allowed to correlate (e.g., A1 with A2; C3 with C4; P5 with P6).

Model 2: Higher order correlated residuals. This model is an extension of Model 1. In addition to five lower order factors, in this model, it is hypothesized that all covariance between lower order factors can be explained by a single higher order factor which is termed *Language Class Anxiety (LCA)*. Correlated residual variances of cognitive, affective and physiological items across L2 domains were also included in this model (Figure 2). Like Model 1, the correlated residuals were specified a priori. Without exception, all the residuals variances of the cognitive, affective and physiological items across different L2 domains were allowed to correlate (e.g., A1 with A2; C3 with C4; P5 with P6).

Model 3: Lower order L2 anxiety with three method factors. In Model 3, instead of correlating the residuals of cognitive, affective and physiological items across L2 domains, these are introduced to the model as three method factors. It is hypothesized that the items load on both their theoretical constructs which are LAA, RAA, SAA, WAA and CTA and the latent method factors which are cognitive, affective and physiological constructs (Figure 3).

Model 4: Bifactor model with correlated residual variance. In Model 4, all the items load on one general factor representing *Language Class Anxiety*. Additionally, there are five group factors (LAA, RAA, SAA, WAA and CTA) which represent common factors measured by the items and potentially explain item response variance which could not be accounted for by the general factor. Correlated residual variances of cognitive, affective and physiological items across L2 domains were also included and allowed to correlate with each other. The general and group factors were uncorrelated (Figure 4). The correlated residuals were specified a priori. Without exception, all the residuals variances of the cognitive, affective and physiological items across different L2 domains were allowed to correlate (e.g., A1 with A2; C3 with C4; P5 with P6).

Model 5: Bifactor model without correlated residual variance. Model 5 is almost the same as Model 4 except that in Model 5, correlated residual variances of cognitive, affective and physiological items across L2 domains were not included.

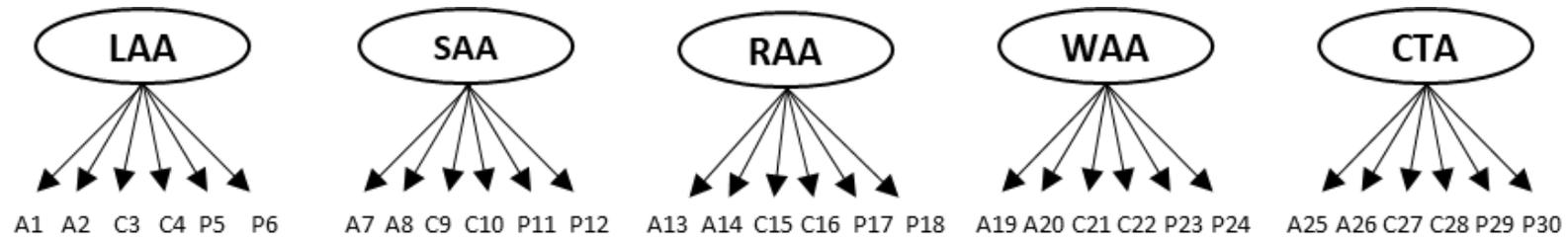


Figure 1. Lower Order Correlated Residuals. For simplicity, the relations between corresponding residuals were omitted.

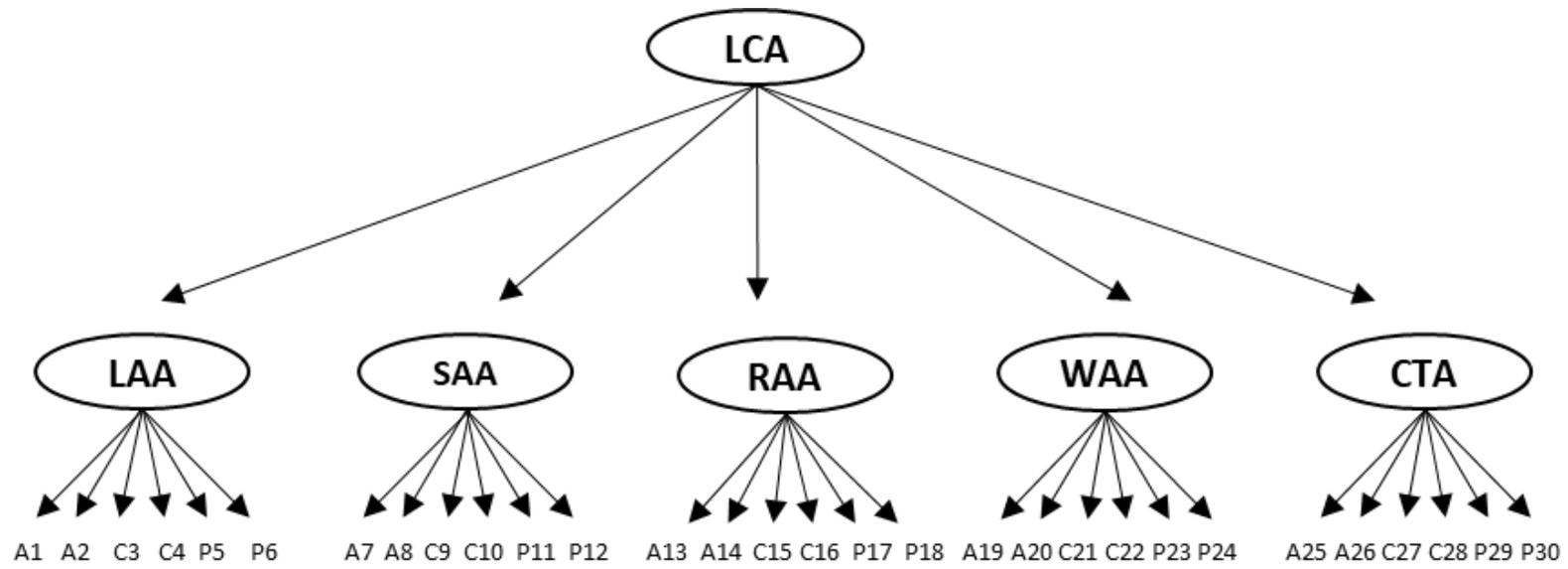


Figure 2. Higher Order Correlated Residuals. For simplicity, the relations between corresponding residuals were omitted.

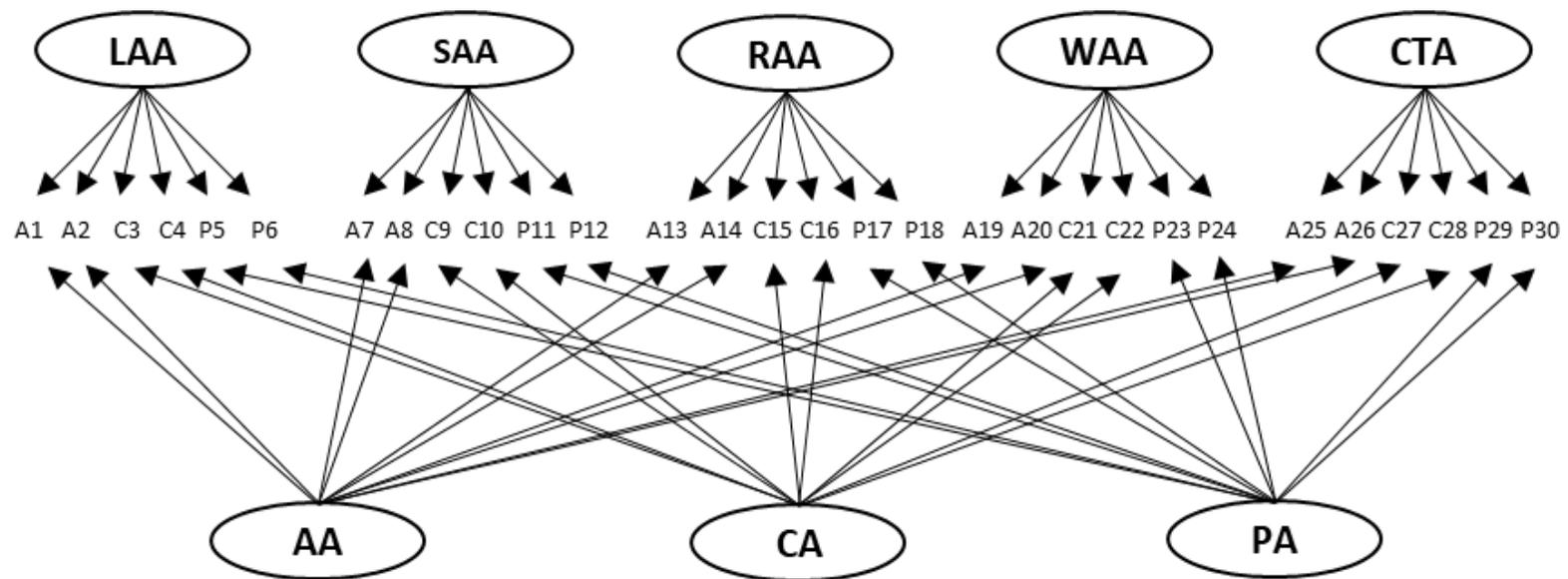


Figure 3. Lower Order L2 Anxiety with Three Method Factors.

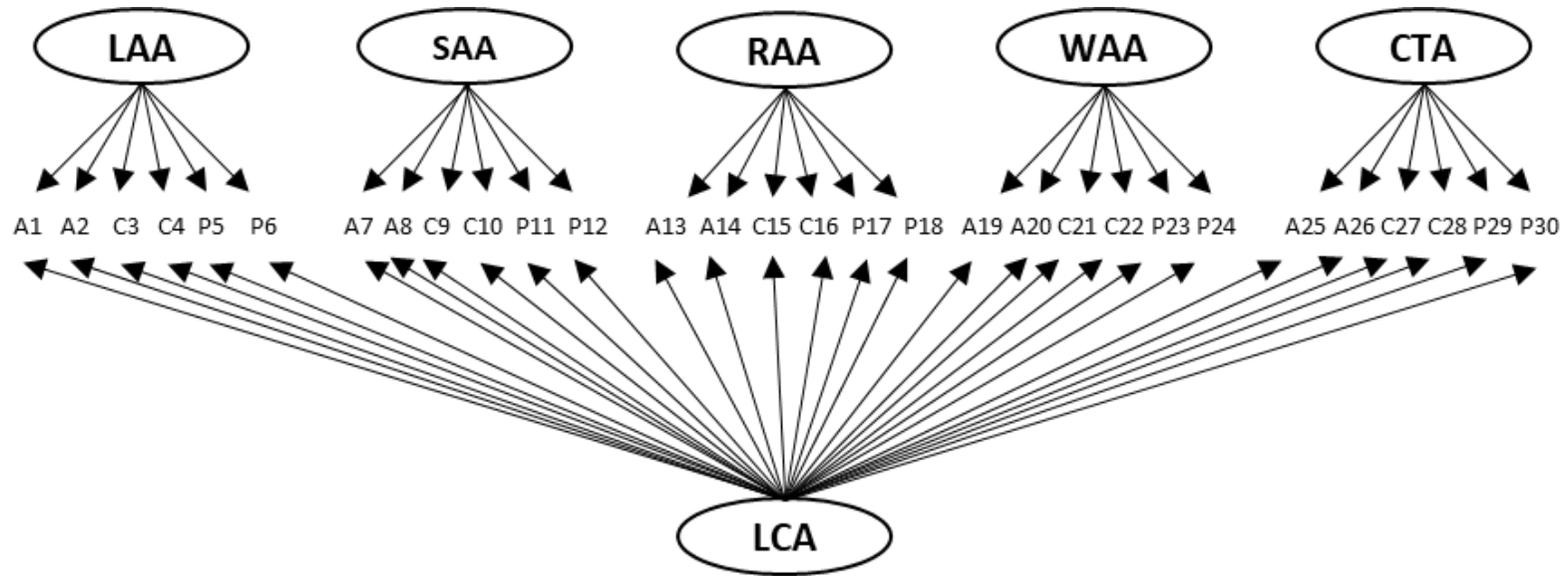


Figure 4. Bifactor model with correlated residual variance. For simplicity, the relations between corresponding residuals were omitted.

Appendix

Listening Class Anxiety Scale

1. Thinking about listening activities in class makes me feel uneasy.
2. I feel nervous during listening activities in class.
3. Even before listening activities in class, I worry whether I will be able to understand the material.
4. I worry whether I am sufficiently prepared for listening activities in class
5. I get tense during listening activities in class.
6. When I don't understand something important during listening activities in class, my heart races.

Writing Class Anxiety Scale

1. Thinking about writing activities in class makes me feel uneasy.
2. I feel nervous during writing activities in class.
3. Even before writing activities in class, I worry whether I will be able to understand the material.
4. I worry whether I am sufficiently prepared for writing activities in class
5. I get tense during writing activities in class.
6. When I don't understand something important during writing activities in class, my heart races.

Reading Class Anxiety Scale

1. Thinking about reading activities in class makes me feel uneasy.
2. I feel nervous during reading activities in class.
3. Even before reading activities in class, I worry whether I will be able to understand the material.
4. I worry whether I am sufficiently prepared for reading activities in class
5. I get tense during reading activities in class.
6. When I don't understand something important during reading activities in class, my heart races.

Speaking Class Anxiety Scale

1. Thinking about speaking activities in class makes me feel uneasy.
2. I feel nervous during speaking activities in class.
3. Even before speaking activities in class, I worry whether I will be able to understand the material.
4. I worry whether I am sufficiently prepared for speaking activities in class
5. I get tense during speaking activities in class.
6. When I don't understand something important during speaking activities in class, my heart races.
- 7.

Classroom Testing Anxiety Scale

1. Thinking about taking an English language test makes me feel uneasy.
2. I feel nervous while taking an English language test.
3. Even before taking an English language test, I worry whether I will be able to understand the material.
4. I worry whether I am sufficiently prepared for taking an English language test.
5. I get tense while taking an English language test.
6. When I don't understand something important while taking English language test, my heart races.

Mplus Syntax for Model 4 in Study 1

Here we present an example of the Mplus syntax we used to generate data and fit the models with studied approaches.

```
Title:      Pilot Study;

Data:      File is 'Pilot_Study.dat';

Variable:  missing = all (999);
           name = y1-y30
           Usevariables are y1-y30;

Analysis:  Estimator = MLR;
           type = general;

Model: SAA by y1-y6;
       RAA by y7-y12;
       WAA by y13-y18;
       LAA by y19-y24;
       TAA by y25-y30;

       LCA BY y1-y30;

!Affective items: y1-y2-y7-y8-y13-y14-y19-y20-y25-y26
!Cognitive items: y3-y4-y9-y10-y15-y16-y21-y22-y27-y28
!Physiological items: y5-y6-y11-y12-y17-y18-y23-y24-y29-y30

!Correlated residuals - Affective items
y1 with y2; y1 with y7; y1 with y8;
y1 with y13; y1 with y14; y1 with y19;
y1 with y20; y1 with y25; y1 with y26;
y2 with y7; y2 with y8; y2 with y13;
y2 with y14; y2 with y19; y2 with y20;
y2 with y25; y2 with y26; y7 with y8;
y7 with y13; y7 with y14; y7 with y19;
y7 with y20; y7 with y25; y7 with y26;
y8 with y13; y8 with y14; y8 with y19;
y8 with y20; y8 with y25; y8 with y26;
y13 with y14; y13 with y19; y13 with y20;
y13 with y25; y13 with y26; y14 with y19;
y14 with y20; y14 with y25; y14 with y26;
y19 with y20; y19 with y25; y19 with y26;
y20 with y25; y20 with y26; y25 with y26;

!Correlated residuals - cognitive items
y3 with y4; y3 with y9; y3 with y10;
y3 with y15; y3 with y16; y3 with y21;
y3 with y22; y3 with y27; y3 with y28;
y4 with y9; y4 with y10; y4 with y15;
y4 with y16; y4 with y21; y4 with y22;
y4 with y27; y4 with y28; y9 with y10;
y9 with y15; y9 with y16; y9 with y21;
y9 with y22; y9 with y27; y9 with y28;
y10 with y15; y10 with y16; y10 with y21;
y10 with y22; y10 with y27; y10 with y28;
y15 with y16; y15 with y21; y15 with y22;
y15 with y27; y15 with y28; y16 with y21;
y16 with y22; y16 with y27; y16 with y28;
y21 with y22; y21 with y27; y21 with y28;
y22 with y27; y22 with y28; y27 with y28;

!Correlated residuals - physiological items
y5 with y6; y5 with y11; y5 with y12;
y5 with y17; y5 with y18; y5 with y23;
y5 with y24; y5 with y29; y5 with y30;
```

y6 with y11; y6 with y12; y6 with y17;
y6 with y18; y6 with y23; y6 with y24;
y6 with y29; y6 with y30; y11 with y12;
y11 with y17; y11 with y18; y11 with y23;
y11 with y24; y11 with y29; y11 with y30;
y12 with y17; y12 with y18; y12 with y23;
y12 with y24; y12 with y29; y12 with y30;
y17 with y18; y17 with y23; y17 with y24;
y17 with y29; y17 with y30; y18 with y23;
y18 with y24; y18 with y29; y18 with y30;
y23 with y24; y23 with y29; y23 with y30;
y24 with y29; y24 with y30; y29 with y30;

LCA WITH RAA@0 WAA@0 LAA@0 TAA@0 SAA@0;
SAA WITH RAA@0 WAA@0 LAA@0 TAA@0 LCA@0;
RAA WITH SAA@0 WAA@0 LAA@0 TAA@0 LCA@0;
WAA WITH RAA@0 SAA@0 LAA@0 TAA@0 LCA@0;
LAA WITH RAA@0 WAA@0 SAA@0 TAA@0 LCA@0;
TAA WITH RAA@0 WAA@0 LAA@0 SAA@0 LCA@0;

Output: STDYX MODINDICES;