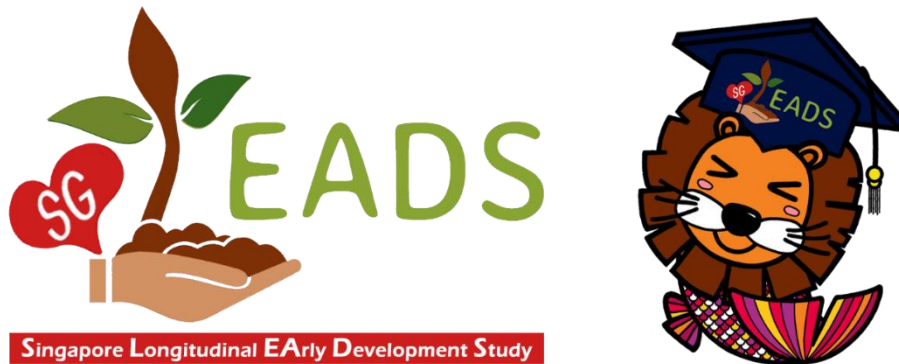# Singapore Longitudinal Early Development Study (SG LEADS)

Panel Survey Wave 1

Technical Report 9

Scoring Guide for Temperament Measures

Hong Yee Shiun, Ryan

Centre of Family and Population Research
National University of Singapore

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Background: The Infant Behavior Questionnaire (IBQ) has several versions - the original (191 items), the Short Form (SF; 91 items), and the Very Short Form (VSF; 37 items).   THe IBQ-VSF was first proposed to be used in SGLeads.

However, due to the need to incorporate many other measures in the survey, there is a need to cut items further. Hence, Dr Ryan Hong (NUS Psychology) reduced the number of items to a total of 18, with 6 items measuring each of the 3 temperament dimensions - Surgency, Negative Affectivity, and Effortful Control.

The items, organized by their respective dimensions are presented below. The alphabet (last column) represents the item identifier in the SGLeads survey form. The numbers in front represent the corresponding item numbers.

I. Surgency

Items	SGLeads
1. When tossed around playfully how often did the baby laugh?	a
6. How often during the week did your baby move quickly toward new objects?	f
8. When placed on his/her back, how often did the baby squirm and/or turn body?	h
9. During a peekaboo game, how often did the baby laugh?	i
11. When visiting a new place, how often did your baby get excited about exploring new surroundings?	k
12. How often during the last week did the baby smile or laugh when given a toy?	l

II. Negative Affectivity

Items	SGLeads
2. When tired, how often did your baby show distress?	b
3. When introduced to an unfamiliar adult, how often did the baby cling to a parent?	c
10. How often did the baby seem angry (crying and fussing) when you left her/him in the crib?	j
13. How often during the last week did the baby protest being placed in a confining	m

place (infant seat, play pen, car seat, etc.)?	
17. When the baby wanted something, how often did s/he become upset when s/he could not get what s/he wanted?	q
18. When in the presence of several unfamiliar adults, how often did the baby cling to a parent?	r

III. <u>Effortful Control</u>

Items	SGLeads
4. How often during the last week did the baby enjoy being read to?	d
5. How often during the last week did the baby play with one toy or object for 5-10 minutes?	e
7. When singing or talking to your baby, how often did s/he soothe immediately?	g
14. When being held, in the last week, did your baby seem to enjoy him/herself?	n
15. When showing the baby something to look at, how often did s/he soothe immediately?	o
16. How often during the last week did the baby enjoy gentle rhythmic activities, such as rocking or swaying?	p

Scoring Procedure

Each IBQ item is rated by the parent as 1 (*Never*) to 7 (*Always*), or NA (*Does not apply*).   Scale scores for the IBQ represent the mean score of all scale items applicable to the child, as judged by the caregiver. Scales' scores are to be computed by the following method:

1. Sum all numerical item responses for a given scale. Note that:

    a) If caregiver omitted an item, that item receives no numerical score;

    b) If caregiver checked the "does not apply" response option for an item, that item

receives no numerical score;

2.   Divide the total by the number of items receiving a numerical response. Do not include items marked "does not apply (N/A)" or items receiving no response in determining the number of items.

IMPORTANT!

In SPSS, enter the numerical values (1-7) as they are. If a parent indicates NA, leave as missing data. When computing the scale score, use the COMPUTE function, and use the Operator "Mean". Assuming that the items are labeled as ibq1, …., ibq18.

COMPUTE IBQ_SU = MEAN (ibq1, ibq6, ibq8, ibq9, ibq11, ibq12).

COMPUTE IBQ_NA = MEAN (ibq2, ibq3, ibq10, ibq13, ibq17, ibq18).

COMPUTE IBQ_EC = MEAN (ibq4, ibq5, ibq7, ibq14, ibq15, ibq16).

More information can be found in https://research.bowdoin.edu/rothbart-temperament-questionnaires/

Reference:

Putnam, S. P., Helbig, A. L., Gartstein, M. A., Rothbart, M. K. & Leerkes, E. (2014). Development and Assessment of Short and Very Short Forms of the Infant Behavior Questionnaire-Revised. *Journal of Personality Assessment, 96*, 445-458.

SGLeads
Scoring Guide for
Modified Early Childhood Behavior Questionnaire (2 - 3 Years Old)

(modified to have 6 items per dimension)

Prepared by Ryan Hong
Oct 2019

Background: The Early Childhood Behavior Questionnaire (ECBQ) has several versions. The one we are using here is the modified Very Short Form (VSF; 36 items).   The ECBQ-VSF was first proposed to be used in SGLeads.

However, due to the need to incorporate many other measures in the survey, there is a need to cut items further. Hence, Dr Ryan Hong (NUS Psychology) reduced the number of items to a total of 18, with 6 items measuring each of the 3 temperament dimensions - Surgency, Negative Affectivity, and Effortful Control.

The items, organized by their respective dimensions are presented below. The alphabet (last column) represents the item identifier in the SGLeads survey form. The numbers in front represent the corresponding item numbers.

I. Surgency

Items	SGLeads
3. **When a familiar child came to your home,** how often did (CHILD) seek out the company of the child?	c
4. **While playing outdoors,** how often did (CHILD) choose to take chances for the fun and excitement of it?	d
6. **When encountering a new activity,** how often did (CHILD) get involved immediately?	f
9. **When playing outdoors with other children,** how often did (CHILD) seem to be one of the most active children?	i
12. **Before an exciting event (such as receiving a new toy),** how often did (CHILD) get very excited about getting it?	l
18. **When around large gatherings of familiar adults or children,** how often did (CHILD) enjoy playing with a number of different people?	r

Item C did not load very well in EFA. Decide to replace item for Wave 2.

New C**: When encountering a new activity**, how often did (CHILD) get involved immediately?

II. Negative Affectivity

Items	SGLeads
1. **When approached by an unfamiliar person in a public place (for example, the grocery store),** how often did (CHILD) cling to a parent?	a
2. **While having trouble completing a task (e.g. building, drawing, dressing),** how often did (CHILD) get easily irritated?	b
11. **When told "no",** how often did (CHILD) become sadly tearful?	k
13. **When (CHILD) asked for something and you said "no",** how often did (he/she) have a temper tantrum?	m
15. **When visiting a new place,** how often did (CHILD) not want to enter?	o
16. **When (CHILD) was upset, how often did (he/she) cry for more than 3 minutes,** even when being comforted?	p

III. Effortful Control

Items	SGLeads
5. **When engaged in play with (his/her) favorite toy,** how often did (CHILD) continue to play while at the same time responding to your remarks or questions?	e
7. **When engaged in an activity requiring attention, such as building with blocks,** how often did (CHILD) tire of the activity relatively quickly? (Reverse)	g
8. **During everyday activities,** how often did (CHILD) pay attention to you right away when you called to (him/her)?	h
10. **When told "no",** how often did (CHILD) stop the forbidden activity?	j
14. **When asked to wait for a desirable item (such as ice cream),** how often did (CHILD) wait patiently?	n
17. **When you were busy,** how often did (CHILD) find another activity to do when asked?	q

Item G, being a negative-keyed item, did not load well on the factor. To replace in Wave 2.

New G: **When engaged in play with his/her favourite toy**, how often did (CHILD) play for more than 10 minutes?

Scoring Procedure

Each ECBQ item is rated by the parent as 1 (*Never*) to 7 (*Always*), or NA (*Does not apply*). Scale scores for the ECBQ represent the mean score of all scale items applicable to the child, as judged by the caregiver. Scales' scores are to be computed by the following method:

1.   Sum all numerical item responses for a given scale. Note that:

      a)   If caregiver omitted an item, that item receives no numerical score;

      b)   If caregiver checked the "does not apply" response option for an item, that item receives no numerical score;

2.   Divide the total by the number of items receiving a numerical response. Do not include items marked "does not apply (N/A)" or items receiving no response in determining the number of items.

IMPORTANT!

In SPSS, enter the numerical values (1-7) as they are. If a parent indicates NA, leave as missing data. When computing the scale score, use the COMPUTE function, and use the Operator "Mean". Assuming that the items are labeled as ecbq1, …., ecbq18.

RECODE ecbq7 (1=7, 2=6, 3=5, 4=4, 5=3, 6=2, 7=1).

COMPUTE ECBQ_SU = MEAN (ecbq3, ecbq4, ecbq6, ecbq9, ecbq12, ecbq18).

COMPUTE ECBQ_NA = MEAN (ecbq1, ecbq2, ecbq11, ecbq13, ecbq15, ecbq16).

COMPUTE ECBQ_EC = MEAN (ecbq5, ecbq7, ecbq8, ecbq10, ecbq14, ecbq17).

More information can be found in https://research.bowdoin.edu/rothbart-temperament-questionnaires/

Reference:

Putnam, S. P., Jacobs, J., Gartstein, M. A., & Rothbart, M. K. (2010, March). Development and assessment of short and very short forms of the Early Childhood Behavior Questionnaire. *Poster presented at International Conference on Infant Studies*, Baltimore, MD.

SGLeads
Scoring Guide for
Modified Childhood Behavior Questionnaire (4 - 6 Years Old)

(modified to have 6 items per dimension)

Prepared by Ryan Hong
Oct 2019

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Background: The Childhood Behavior Questionnaire (CBQ) has several versions. The one we are using here is the modified Very Short Form (VSF; 36 items).   The CBQ-VSF was first proposed to be used in SGLeads.

However, due to the need to incorporate many other measures in the survey, there is a need to cut items further. Hence, Dr Ryan Hong (NUS Psychology) reduced the number of items to a total of 18, with 6 items measuring each of the 3 temperament dimensions - Surgency, Negative Affectivity, and Effortful Control.

The items, organized by their respective dimensions are presented below. The alphabet (last column) represents the item identifier in the SGLeads survey form. The numbers in front represent the corresponding item numbers.

I. Surgency

Items	SGLeads
3. Likes going down high slides or other adventurous activities.	c
6. Often rushes into new situations.	f
7. Seems to be at ease with almost any person.	g
8. Prefers quiet activities to active games. (Reverse)	h
13. Takes a long time in approaching new situations. (Reverse)	m
15. Is sometimes shy even around people s/he has known a long time. (Reverse)	o

The above items were used in Wave 1. However, the use of both positive and negative keyed items did not result in a coherent dimension. Eventually, based in EFA and reliability analysis, decide to use items H, M, and O (after reversing) as indicators of Surgency.

Hence, **decide to modify this for Wave 2**. To include the same H, M, and O items. But change C, F, and G.

New items (all in the direction of low Surgency, and thus need recoding like H, M, O) are:

C = Sometimes turns away shyly from new acquaintances
F = Dislikes rough and rowdy games
G = When outside, often sits quietly

Still, the use of all items in the direction of low Surgency might miss capturing the high ends of Surgency. Can we include 2 more items to capture this high end of Surgency. If these 2 items work out, then we can include them. If no, we can still use the 6 items that tap low Surgency behaviors.

Two more items:

1) Is full of energy, even in the evening.
2) Gets very enthusiastic about the things s/he does.

These new items are taken from CBQ.

II. Negative Affectivity

Items	SGLeads
1. Gets quite frustrated when prevented from doing something s/he wants to do.	a
4. Is quite upset by a little cut or bruise.	d
9. When angry about something, s/he tends to stay upset for ten minutes or longer.	i
11. Seems to feel depressed when unable to accomplish some task.	k
16. Is very difficult to soothe when s/he has become upset.	p
18. Gets angry when s/he can't find something s/he wants to play with.	r

III. Effortful Control

Items	SGLeads
2. When drawing or colouring in a book, shows strong concentration.	b
5. Prepares for trips and outings by planning things s/he will need.	e
10. When building or putting something together, becomes very involved in what s/he is doing, and works for long periods.	j

12. Is good at following instructions.	l
14. Likes the sound of words, such as nursery rhymes.	n
17. Approaches places s/he has been told are dangerous slowly and cautiously.	q

Scoring Procedure

Each CBQ item is rated by the parent as 1 (*Never*) to 7 (*Always*), or NA (*Does not apply*). Scale scores for the CBQ represent the mean score of all scale items applicable to the child, as judged by the caregiver. Scales' scores are to be computed by the following method:

1. Sum all numerical item responses for a given scale. Note that:

   a) If caregiver omitted an item, that item receives no numerical score;

   b) If caregiver checked the "does not apply" response option for an item, that item receives no numerical score;

2. Divide the total by the number of items receiving a numerical response. Do not include items marked "does not apply (N/A)" or items receiving no response in determining the number of items.

IMPORTANT!

In SPSS, enter the numerical values (1-7) as they are. If a parent indicates NA, leave as missing data. When computing the scale score, use the COMPUTE function, and use the Operator "Mean". Assuming that the items are labeled as cbq1, …., cbq18.

RECODE cbq8 cbq13 cbq15 (1=7, 2=6, 3=5, 4=4, 5=3, 6=2, 7=1).

COMPUTE CBQ_SU = MEAN (cbq3, cbq6, cbq7, cbq8, cbq13, cbq15).

COMPUTE CBQ_NA = MEAN (cbq1, cbq4, cbq9, cbq11, cbq16, cbq18).

COMPUTE CBQ_EC = MEAN (cbq2, cbq5, cbq10, cbq12, cbq14, cbq17).

More information can be found in https://research.bowdoin.edu/rothbart-temperament-questionnaires/

Reference:

Putnam, S. P., & Rothbart, M. K. (2006). Development of Short and Very Short forms of the Children's Behavior Questionnaire. *Journal of Personality Assessment, 87*, 103-113.

Preliminary Findings for Temperament

Dec 2020

Based on modifications on the temperament scales, the reliabilities of the scales are as follow:

IBQ	ECBQ	CBQ
SU/EC = .913 (12 items)	SU = .761 (5 items)	SU = .540 (3 items)
NA = .814 (6 items)	NA = .712 (6 items)	NA = .753 (6 items)
	EC = .638 (5 items)	EC = .653 (6 items)

No ideal because of the need to drop certain items. Results need to be interpreted with caution for CBQ SU.

Gender by Age effects on Temp

Conducted 2 x 2 ANOVAs on the temperament scales. Separately by the 3 scales because mean levels might not be comparable across scales especially when we have used only small numbers of items per scale.

Note: No significant interaction effect between gender and age found across all analyses.
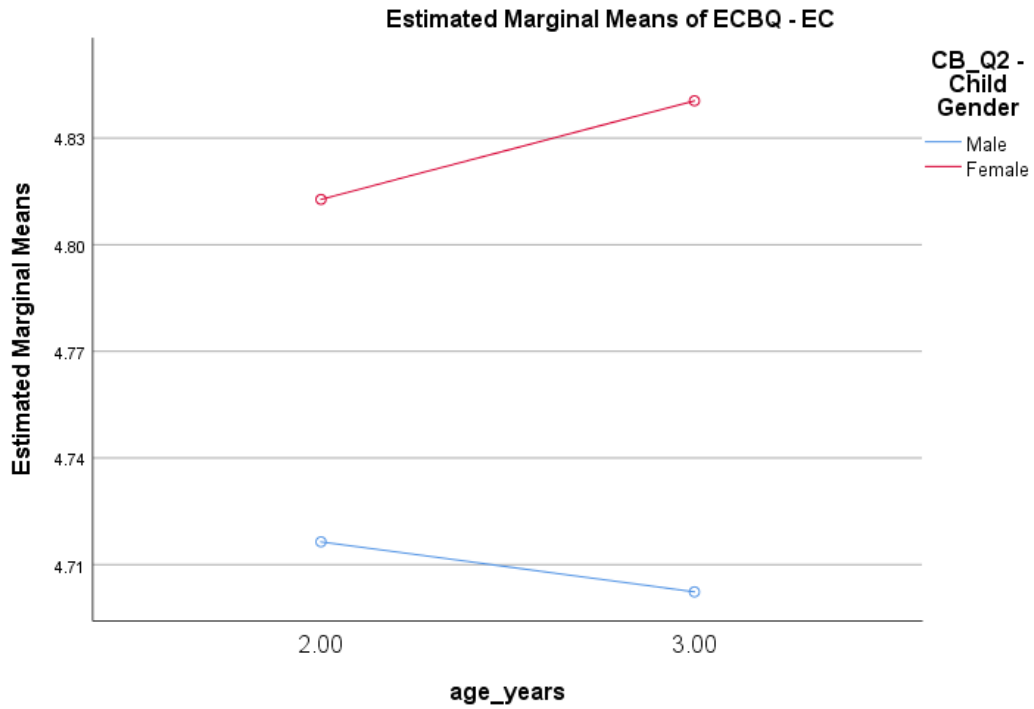
IBQ (age_years = 0 to 1)
- Significant age effects (increases) for both SU/EC and NA factors. No gender differences.

Estimated Marginal Means of IBQ - NA
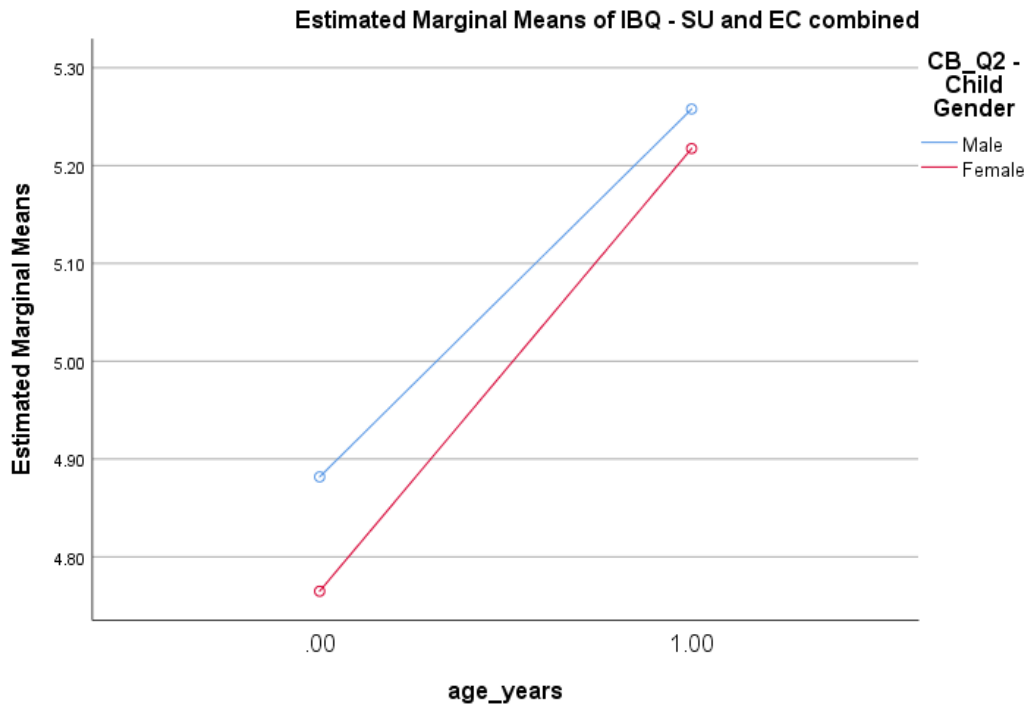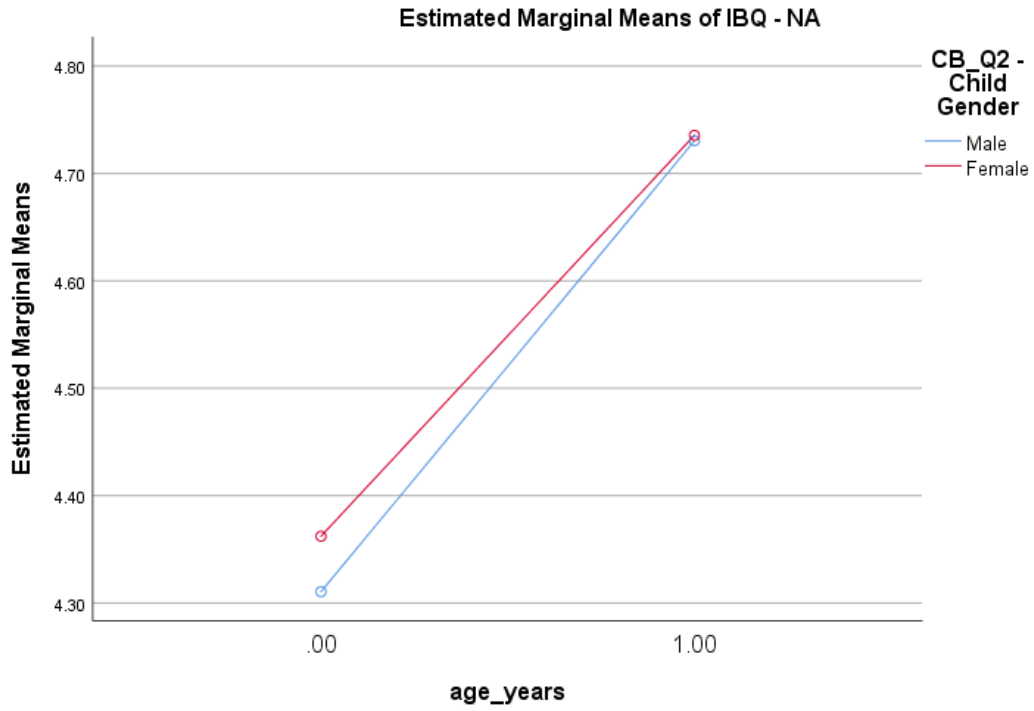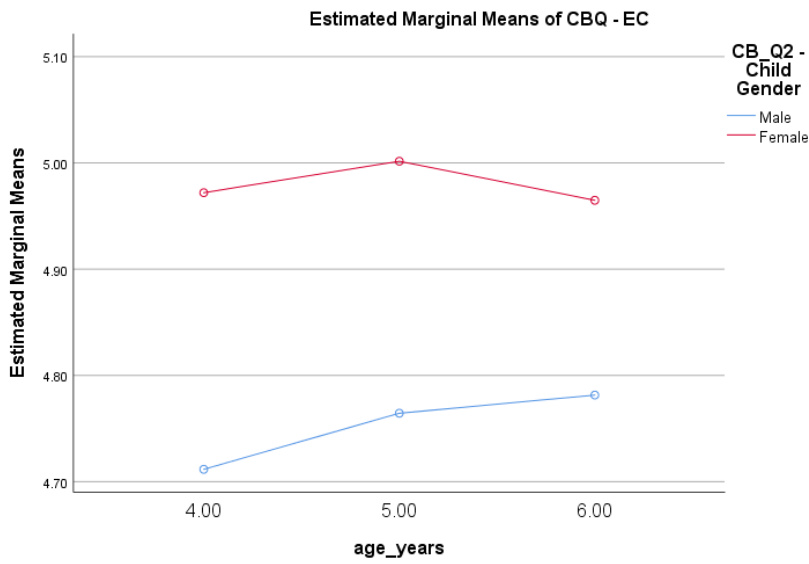
ECBQ (age_years = 2 to 3)
- SU: No main effects.
- NA: No main effects.
- EC: Sign gender effects (Girls higher on EC than boys).

Estimated Marginal Means of ECBQ - EC

CBQ (age_years = 4 to 6)
- SU: Sign age and gender effects. Increase in SU with age, M > F
- NA: Sign age effect. Decrease in NA with age.
- EC: Sign gender effect. F > M

Estimated Marginal Means of CBQ - NA

Estimated Marginal Means of CBQ - EC
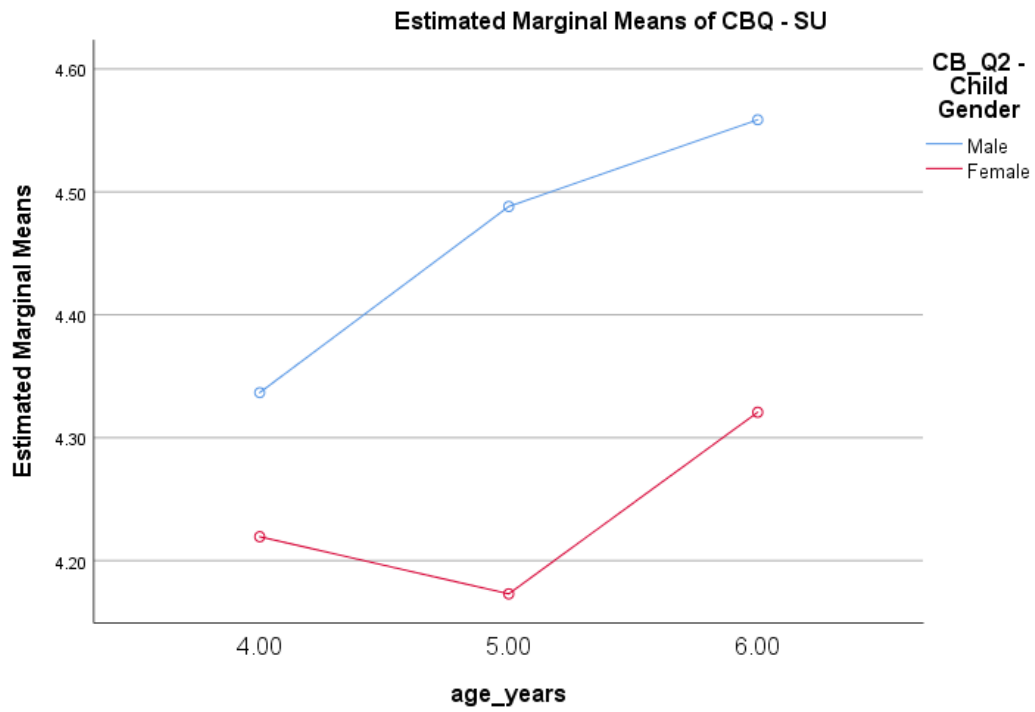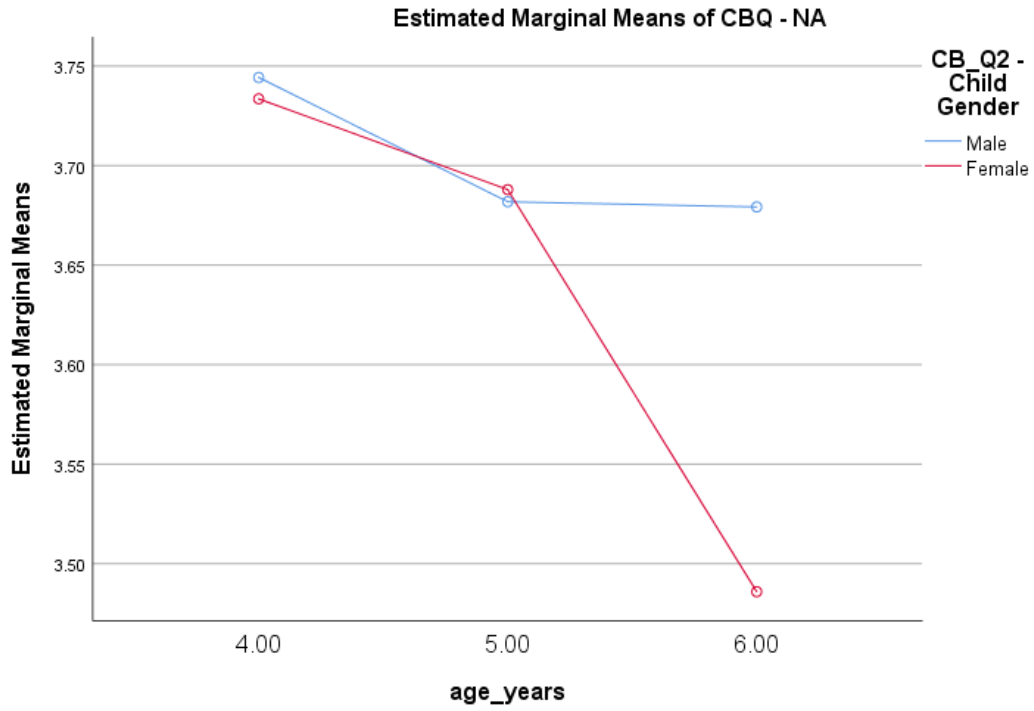
Some interesting age and gender differences found for children age 4-6 years old using the CBQ.

Recommendation:
To present the ECBQ and CBQ results as a report for lay audience.

Research Brief

In SGLeads, three basic child temperament dimensions were obtained from parental reports. These temperament dimensions reflect stable differences in emotional reactivity and self-regulation that emerge early in life. They are also considered to be precursors to subsequent adult personality. The three temperament dimensions are Surgency, Negative Affectivity, and Effortful Control.

Children high on surgency are characterized by high levels of positive emotions and activity. They approach novel situations easily, and are generally sociable. However, in the Asian context, high on surgency is sometimes seen as being impulsive and not restrained.

Children high on negative affectivity tend to exhibit negative emotions such as fear, anger, and sadness. When frustrated, such children find it difficult to soothe their negative feelings.

Children high on effortful control are able to allocate their attention effectively (e.g., focusing on tasks even when there are distractions) and assert control over their behavior in relation to the demands of the situation. In short, high effortful control children are able to self-regulate their behavior effectively to pursue goals.

The SGLeads data suggest that 6 year-old children showed higher surgency compared to 4 year-olds. There was also a slight decline in negative affectivity from ages 4 to 6. Gender differences in temperament were observed for surgency and effortful control, but not for negative affectivity. Specifically, boys exhibited higher surgency (e.g., being active, excitable, and sociable) than girls across the ages (see Figure 1). Conversely, girls showed better effortful control (e.g., maintaining focus) than boys (see Figure 2). This gender difference favouring the girls in effortful control was also found in younger children (ages 2-3 years).

These observations are consistent with past research findings, reflecting the strong biological influences on the gender differentiation of temperamental characteristics among young children.
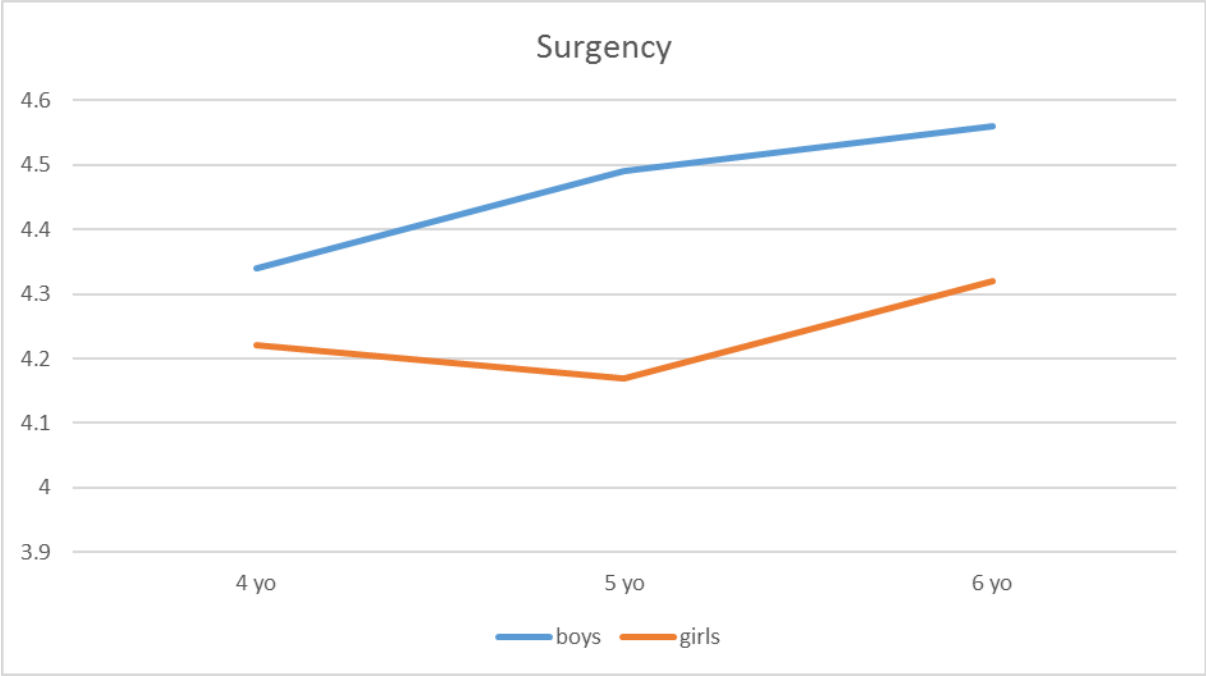
Figure 1. Surgency by age and gender.

Figure 2. Effortful control by age and gender.